Lindsay District Fisheries Management Plan

1989 - 2000

Ontario
Ministry of Natural Resources
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Minister

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PREFACE

The Lindsay District Fisheries Management Plan includes fisheries resource information and management strategies, and was prepared to identify long term management direction to the year 2000 and specific short term (5 year) management actions for the Lindsay District.

The plan has been developed in accordance with the Southern Ontario Coordinated Program Strategy (CPS), Strategic Planning For Ontario Fisheries (SPOF), the Lindsay District Land Use Guidelines (DLUG), the Lindsay District Summary Report, Background Information and Optional Management Strategies and Tactics, the Lake Ontario Fisheries Management Plan, and public responses from the fisheries management plan public meetings.

The Lindsay District Fisheries Management Plan will provide a measure which can be used by fisheries managers and the public to evaluate the effectiveness of the fisheries program.

Regional Director

District Manager

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1.0 INTRODUCTION

1.1 Purpose

The purpose of the fisheries management plan is to identify how the fisheries resources will be managed to the year 2000 and to identify specific short-term (5 year) management actions which are required to meet specific fisheries objectives in the Lindsay District.

1.2 Fisheries Planning Process, Existing Policy and Technical Direction

The Federal Department of Fisheries and Oceans is responsible for the management of fisheries in Canada. However, through the Canada-Ontario Agreement the responsibility of the day-to-day management of the inland waters of Ontario has been delegated to the Ministry of Natural Resources. This delegation of responsibility includes the acceptance of the policies and objectives of the Department of Fisheries and Oceans.

The Lindsay District Fisheries Management Plan is part of the overall provincial resource planning and management system of the Ministry of Natural Resources. Objectives and targets for the plan are provided through program policy, the Southern Ontario Coordinated Program Strategy (CPS), the Lindsay District Land Use Guidelines (DLUG) (OMNR, 1983), Strategic Planning For Ontario Fisheries (SPOF), and the Lake Ontario Fisheries Management Plan.

The Lindsay District Management Plan tests the proposed direction, provides the basis for revisions to the strategic policy, and provides strategies which will be used to meet the objectives and targets. The fisheries management plan also identifies fisheries concerns to be considered in other resources management plans and identifies the concerns of other programs.

The original fisheries targets and management direction identified in the District Land Use Guidelines in 1983 were formulated with the best available information. During the fisheries management planning exercise, new data were used to formulate more realistic and up-to-date targets. With approval of the District Fisheries Management Plans, the District Land Use Guidelines have been amended simultaneously to reflect changes in fisheries targets and management direction.

Other provincial and federal agencies have been given an opportunity to review the plan to ensure that the strategies and tactics are compatible with their management programs which also affect the fisheries. For example, the beds of most of the Kawartha Lakes and interconnecting waterways are federal crown land and are administered by the Trent-Severn Waterway which is part of Environment Canada, Parks. The Waterway has the final responsibility under the federal Heritable Canal Regulations for granting approval for dredging and filling on this federal crown land. The Trent-Severn Waterway work closely with Ministry of Natural Resources to ensure that fisheries concerns are addressed.

The Lindsay District Fisheries Management Plan highlights some of the background information and analyses which were undertaken as part of the planning process. The following documents were prepared in the development of the plan and contain additional information:

1. Terms of Reference (OMNR unpublished, 1986a)
2. Detailed Background Report (OMNR unpublished, 1987a)
3. Summary Report, Background Information and Optional Management Strategies and Tactics (OMNR unpublished, 1987b)
4. Analysis of Public Input, First Round July 1987 (OMNR unpublished, 1987c)
5. Lindsay District Fisheries Management Plan. Draft (OMNR, 1987d).
6. Analysis of Public Input to Draft Plan, Second Round February 1988 (OMNR, 1988).

In addition to information on the fisheries resource and fisheries management direction, the fisheries management plan contains a five year implementation schedule which describes specific tactics (management action) which will be used to meet fisheries objectives and targets. The plan and five year implementation schedule are flexible and will be revised and amended as management direction and priorities change within the district. Any major changes will only be made after public consultation.

The schedule will be updated internally on an annual basis during the work plan exercise when projects and budgets for the following year are developed in accordance with the priorities identified in the plan. However, the schedule will be formally updated only every five years with the approval of the Regional Director and subject to public review.
The next formal review will begin in 1993.

2.0 DISTRICT FISHERIES PERSPECTIVE

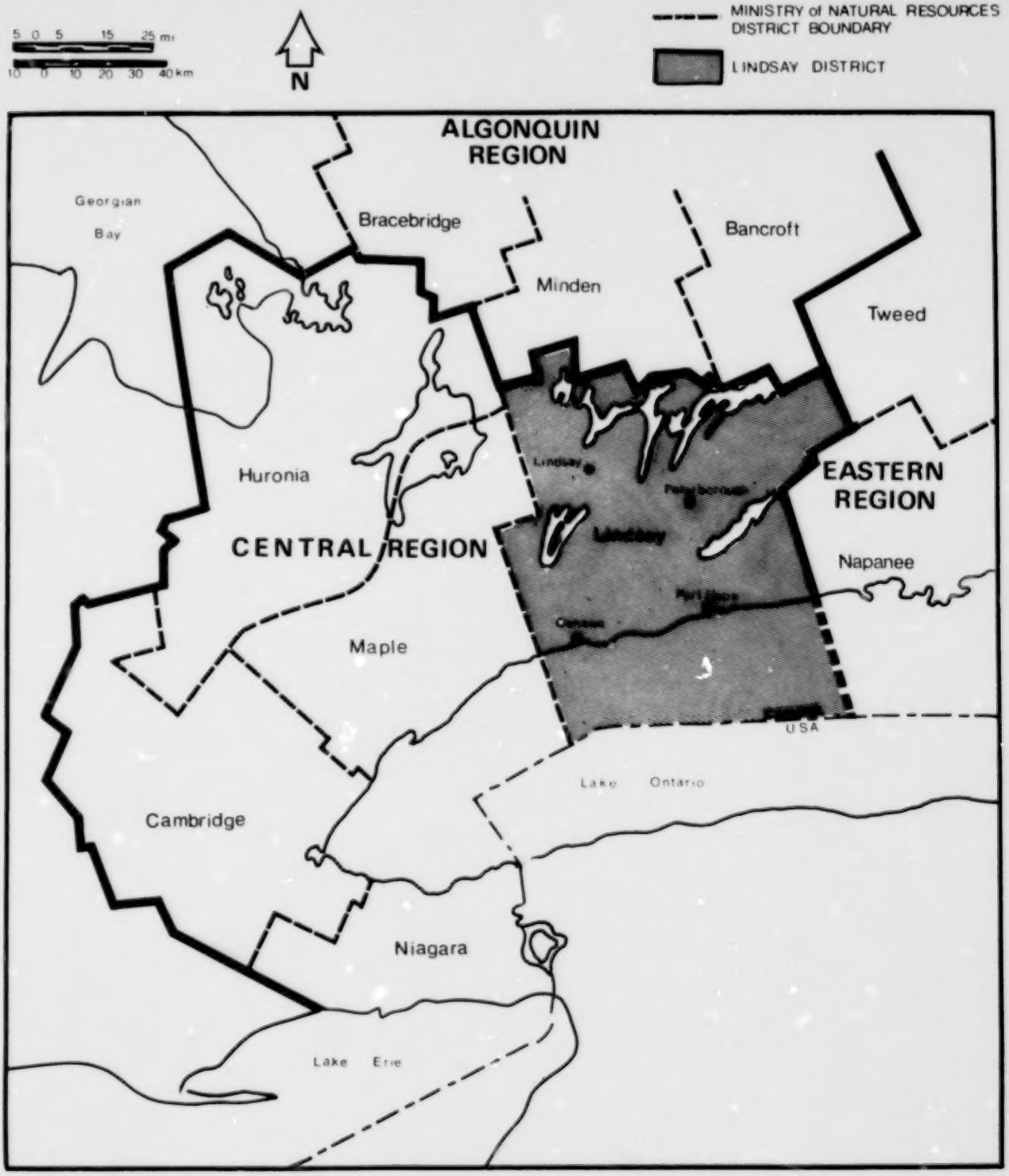
2.1 Lindsay District

The Lindsay District is located in South Central Ontario and includes 41 municipalities within the southern portions of the Counties of Peterborough and Victoria, the western section of the County of Northumberland and the eastern section of the Regional Municipality of Durham. The district (Figure 1) is located in the Central Region of the Ministry of Natural Resources and is bounded to the west by the Maple and Huronia Districts (Central Region), to the north by the Minden and Bancroft Districts (Algonquin Region) and to the east by Napanee and Tweed Districts (Eastern Region). The Lindsay District manages an area of approximately 9903 km^2 including 501 km^2 of inland waters and 2933 km^2 of Lake Ontario.

Figure 1

LINDSAY DISTRICT

REGIONAL SETTING



The 1982 estimate of permanent residents in the district was 386,409. The larger urban areas include the Cities of Peterborough (61,600) and Oshawa (118,900), and the Towns of Whitby (38,500), Newcastle (32,000), Lindsay (14,100), Cobourg (13,000) and Port Hope (10,300). There is a large influx of summer residents to the area especially around the Kawartha Lakes.

Four Indian reservations are located in the Lindsay District including: Scugog Island (No. 34), Curve Lake (No. 35), Hiawatha (No. 36), and Alderville (No. 37). The total area of the reserves is 3210 ha and the population is 1300 (Figure 2).

The majority of district land is under private ownership (98%). The co-operation of private landowners is essential to fisheries management in the district.

The physiography within the Lindsay District is highly variable as a result of the glacial activity during the Pleistocene Epoch. Of the 55 physiographic regions of Southern Ontario, the following nine are found in the district: The Oak Ridges Moraine, the Peterborough drumlin field, the South slope, the Schomberg clay plains, Simcoe lowlands, Carden plain, the Dummer moraines, the Iroquois plain and the Georgian Bay fringe.

The Oak Ridges Moraine which is a complex mix of glacially deposited sands, gravels and tills is located in the southern section of the district and forms the height of land which separates the streams flowing into Lake Ontario from those which flow into Georgian Bay and the Trent River. This region is extremely important because it is the source area for most of the coldwater streams in the Lindsay District.

The area between the Oak Ridges Moraine and Lake Ontario was the first to be settled. The resulting activities such as land clearing, dam construction and urbanization had a major impact on the native fish populations and fish habitat. As urbanization increases especially in the Oshawa-Bowmanville-Newcastle area, the quality of the coldwater streams may be threatened.

The warmwater Kawartha Lakes and associated tributaries are mainly situated on the Peterborough drumlin field and the Dummer moraines. The predominant fish species are walleye, muskellunge, bass, panfish and coarse fish. Agriculture is the predominant use with over 40% of the land used for grazing livestock. The agricultural activity and the intensive cottage development along the waterways has increased nutrient inputs and has contributed to abundant aquatic weed growth. Many agencies are working together to limit nutrient inputs and maintain the high quality fishery.

The good fishing and attractive nature of the lakes in the Lindsay District has resulted in extensive cottage development and the establishment of numerous tourist operations. This development in addition to the large number of daytrippers from the larger urban areas has put heavy pressure on the fisheries resources in the form of heavy fishing effort and modification of fish habitat through dredging and

filling. Management efforts have been implemented to ensure these activities do not have a negative impact on the valuable fisheries resources.

2.2 Fisheries Resource

The water area in the Lindsay District includes 39 warmwater lakes (484 km^2), 47 streams with coldwater sections (1.7 km^2), 76 streams with warmwater sections (15.7 km^2) and a section of Lake Ontario (2933 km^2), (Figure 2 and Appendix I). The total number of streams in the district is 109 with 14 streams which have both coldwater and warmwater sections.

The total area of warmwater lakes is 48,395 hectares (ha). However, seven of these lakes (472 ha) are small and/or very shallow and considered to be unproductive for sport fish. In addition to the warmwater lakes, there are 76 rivers and streams with warmwater sections (1571 ha). Most of the warmwater waterbodies contain walleye, muskellunge, bass, panfish, coarse fish and baitfish.

Migratory fish from Lake Ontario have access to 23 coldwater streams (264 km) in the Lindsay District. Fifteen of these streams have sections which are restricted to resident brook trout and/or brown trout. Resident brook trout and/or brown trout are also present in 24 other streams (191 km) in the District.

The Lindsay District also has jurisdiction over 293,280 ha of Lake Ontario. The lake has a diverse population of fish species. The forage fish are mainly alewife and smelt; and the sport fish include rainbow trout, lake trout, brown trout, chinook salmon, coho salmon, pink salmon, and Atlantic salmon. The harbours, marshes and near shore areas also contain small populations of bass, northern pike, panfish, and coarse fish.

The total potential yield for the Lindsay District is 750,000 kg/yr. In Table 1, the yield is divided into the inland warmwater (499,200 kg/yr), the inland coldwater (1,800 kg/yr) and Lake Ontario fisheries (249,000 kg/yr) and subdivided by species or species groupings (e.g. panfish). The commercial fishery which is restricted to the warmwater lakes has been allocated 71,580 kg/yr of the potential yield.

The estimated potential yield for baitfish is 350,000 doz. The warmwater streams are the main producers of baitfish for the Lindsay District.

Presently, no rare or endangered fish species have been identified in the inland waters of the Lindsay District. The lake sturgeon in Lake Ontario is considered to be rare although it is more common in other parts of Ontario. The lake sturgeon has been considered by the Committee on the Status of Endangered Wildlife in Canada and has not been listed in any of their categories.

2.3 CURRENT USE AND PROJECTED USE

Information in this section will identify how the fish resources are currently being used by sport, commercial and bait harvesters, and indicate what the projected use will be by the year 2000 (Table 1).

2.3.1 Sport Fishery

Estimates of angler use have been calculated from creel survey data. These data indicate that anglers spent approximately 773,500 angler-days (one angler-day equals 4 hours of fishing) fishing in the Lindsay District and harvested 560,800 kg of fish. Resident anglers spent 567,600 angler-days (73%) fishing and harvested 400,900 kg (71%) of fish, and non-residents spent 205,900 angler-days (27%) fishing and harvested 159,900 kg (29%) of fish.

Panfish made up 34% (189,300 kg) of the harvest, with Rice Lake making up 79% (149,900 kg) of the panfish harvest. Walleye constituted 30% (170,000 kg) of the harvest, with rainbow trout (9%, 51,300 kg) and chinook salmon (8%, 43,000 kg), third and fourth in importance.

Projected use as shown in Table 1 was calculated from current use and based on an expected population increase in Ontario of 15% by the year 2000. It is assumed that angling effort will increase at a similar rate. The exception to this is the Lake Ontario fishery which is just beginning to expand. The projected use is anticipated to be over three times higher than the current use. Therefore, the projected use for the Lindsay District by the year 2000 is estimated to be 938,000 angler-days with a corresponding harvest of 727,900 kg of fish.

2.3.2 Commercial Food Fishery

Two commercial licences to take carp are issued annually in the Lindsay District, one on Sturgeon Lake and one on Rice Lake. One experimental hoop-net permit is also issued for Rice Lake and allows for the harvest of a set quantity of carp, bullheads, suckers, and a few panfish.

Since 1984, the commercial fish harvest has been regulated by catch quotas. The quotas for the commercial licences and permit total 71,580 kg. The carp quota is 55,100 kg or 77% of the entire quota.

The average annual harvest for all licences between 1980 and 1986 was 14,817 kg with a value of $9,275. The harvest included bullheads (57%), carp (37%), suckers (3%) and panfish (3%).

2.3.3 Commercial Baitfish Fishery

Harvest licences were issued to 22 harvesters in 1986. Their reported harvest of 48,899 dozen was valued at $45,378. Since 1981, an average of 25 harvesters have taken 57,000 doz minnows with a value of $43,100.

TABLE 1 Current Use, Projected Use to the Year 2000
Potential Yield, Fisheries Targets, For the Lindsay District, 1987.

	Current Use		Projected Use To Year 2000		DLUC Targets 1983		Potential Yield	Target	
	kg	angler-days	kg	angler-days	kg	angler-days	kg	kg	angler-days
Subsistence Fishery	0	--	0	--	0	---	0	----	----
Commercial Fishery									
Baitfish (ave 1981-86)	6,800	--	(7,900)	--	(7,200)	---	42,000	9,000	---
(dozens)	(57,000)	--	(66,000)	--	(60,000)	---	(350,000)	(75,000)	---
Food Fishery (ave. 1980-86)									
Carp	5,400	--	55,000	--	---	---	55,000	5,000	---
Bullhead	8,500	--	9,100	--	---	---	9,100	9,100	---
Sucker	500	--	6,800	--	---	---	6,800	6,800	---
Panfish	400	--	680	--		---	680	680	---
Sub total	14,800		71,580		36,000		71,580	71,580	
Sport Fishery									
Users of Inland Warmwater Lake and Rivers									
Resident	314,900	440,100	362,100	506,100					
Non Resident	141,400	197,700	162,600	227,400					
Sub total	456,300	637,800	524,700	733,500					
Inland Coldwater Rivers									
Resident	1,800	4,400	2,000	5,000					
Non Resident	0	0	0	0					
Sub total	1,800	4,400	2,000	5,000					
Anadromous/Lake-run Fishery									
Resident	43,900	107,200	50,700	124,300					
Non Resident	400	1,100	500	1,300					
Sub total	44,300	108,300	51,200	125,600					
Lake Ontario									
Resident	40,300	15,900	148,500	74,200					
Non Resident	18,100	7,100	1,500	8,800					
Sub total	58,400	23,000	150,000	75,000					

TABLE 1 (Cont'd) Current Use, projected Use to the Year 2000
Potential Yield, Fisheries Targets, For the Lindsay District, 1987.

	Current Use		Projected Use To Year 2000		DLUG Targets 1983		Potential Yield	Target	
	kg	angler-days	kg	angler-days	kg	angler-days	kg	kg	angler-days
Species									
Inland Warmwater Lakes & Rivers									
Walleye	170,000	480,800	195,500	553,000			170,000	170,000	480,800
Muskellunge	19,200	38,900	22,100	44,700			19,200	19,200	38,900
Largemouth Bass	33,100	30,700	38,100	35,300			33,100	33,100	30,700
Smallmouth Bass	31,200	30,000	35,900	34,500			31,200	31,200	30,000
Panfish	189,300	55,500	217,600	63,800			189,300	189,300	55,500
Coarse Fish	13,500	1,900	15,500	2,200			56,400	24,400	9,100
Sub total	456,300	637,800	524,700	733,500			499,200	467,200	645,000
Coldwater Rivers Resident Fish									
Brown Trout	900	2,200	1,000	2,500			900	900	2,200
Brook Trout	900	2,200	1,000	2,500			900	900	2,200
Sub total (Lake-run)	1,800	4,400	2,000	5,000			1,800	1,800	4,400
Anadromous Fishery									
Rainbow Trout	40,000	97,600	46,200	113,200			See Lake Ontario Section	46,200	113,200
Brown Trout	1,900	3,300	2,200	3,900				2,200	3,900
Lake Trout	500	800	600	900				600	900
Chinook Salmon	1,400	6,400	1,600	7,400				1,600	7,400
Coho Salmon	500	200	600	200				600	200
Sub total	44,300	108,300	51,200	125,600				51,200	125,600
Lake Ontario									
Rainbow Trout	11,300	4,500							
Brown Trout	600	200							
Lake Trout	1,200	500							
Chinook Salmon	41,600	16,400							
Coho Salmon	3,700	1,400							
Sub total	58,400	23,000	150,000	75,000			No estimates for individual species		
							249,000	150,000	75,000
TOTAL SPORT FISH	560,800	773,500	727,900	938,000	481,800	850,000	750,000	670,200	850,000

With an estimated 15% increase in demand for baitfish by the year 2000, the demand for baitfish will be 65,000 dozen (7,800 kg). The actual demand will probably be higher because a shortage of baitfish occurs at certain times of the year. With modifications to the licence system it is anticipated that the harvest can be increased to 75,000 doz (9,000 kg).

2.3.4 Tourist Operators

Sport fishing is one of the main tourist attractions in the Lindsay District. According to the Kawartha Development Strategy report, 70 per cent of tourists fish during their stay in the region. There are many tourist operations in the District especially along the Trent-Severn Waterway.

A large charter boat industry has also developed along Lake Ontario. Charter boat operations have been established in Whitby, Oshawa, Bowmanville, Port Hope and Cobourg.

2.3.5 Subsistence Fishery

No subsistence fishery is recognized in the Lindsay District at the present time. However, some native people believe they have special rights. Charges have been laid but the problem still exists. The Ministry of Natural Resources is presently negotiating with native people concerning fishing rights.

2.3.6 Non-Consumptive Users

Many viewing opportunities exist within the Lindsay District. The most spectacular viewing opportunities are associated with the spring run of rainbow trout into the Lake Ontario tributaries. Thousands of people visit the Ganaraska Fishway at Port Hope and other dams to watch the migrating fish.

Spawning walleye also attract hundreds of viewers in the spring at most fastwater areas throughout the Kawartha Lakes. The best viewing is after dark when the fish move into the shallow fast water areas.

2.4 PRESENT MANAGEMENT PRACTICES

The Lindsay District Fisheries Management programs include planning, inventory and assessment, operations and public service. A more detailed description of these is provided in the detailed background document and in other documents and files at the Lindsay District office. However, the following discussion will highlight some of the management programs.

Fish habitat protection and restoration is an important part of our management program. With the signing of the Canada-Ontario Agreement, the province has adopted the federal "Policy For the Management of Fish Habitat" (DFO, 1986). This policy has been developed to increase the natural productive capability of fish habitat (net gain of habitat) through habitat conservation (no net loss of habitat), habitat restoration and habitat develoment (creation of new habitat). This approach to fish habitat will become more important as develpment pressures increase.

At the provincial level, the Ministry of Natural Resources involvement in the input and review of municipal planning documents under the jurisdiction of the Planning Act is considered to be a front line for the defense of fishery habitat. By means of the municipal plan input process, Ministry programs can identify concerns and constraints to municipalities when development is first being considered for an area. If concerns are not addressed at the input stage, the ability to achieve fisheries objectives is reduced. The interrelationship of Official Plan policies, stormwater master drainage plans and specific subdivision plans, requires that each, in turn, must address Ministry concerns. Failure to expend time at the beginning of the planning process and to maintain consistency leads to omission of concerns or confrontation at various points (planning committee meetings, Council or the Ontario Municipal Board).

The protection of the fisheries resources involves a variety of tools or schemes including the following: vegetative buffer zones, sedimentation and erosion control, stormwater management, and timing restrictions. Although this is not an exclusive list, the applicability of any protective measure must be related to the specific site characteristics and the impacts on the fishery resources.

Another federal program which is strongly supported by the Ministry of Natural Resources is the Sea Lamprey Control program. This control program which includes the chemical treatment of streams to control the production of young lamprey (ammoecetes), and the construction of low head barrier dams to prevent adult lamprey from reaching the spawning areas, is extremely important in controlling sea lamprey populations and reducing the impacts of seas lamprey on the important salmonid sport fisheries of the Great Lakes.

Enforcement is a major component of fisheries management in Ontario. It includes enforcement of regulations associated with harvest controls (e.g. seasons, catch limits, etc.) and habitat protection. Habitat protection which includes monitoring of projects to ensure compliance with the conditions of MNR permits and approvals is becoming increasingly important as development pressures increase. To assist in coordinating enforcement activities, districts are developing enforcement plans which will help guide the enforcement program. In addition to enforcing regulations, enforcement staff are actively involved in a variety of fisheries management projects.

Assessment programs are also extremely important. The Kawartha Lakes Fisheries Assessment Unit is located in the Lindsay District and provide critical information concerning the status and stability of the fish populations in the warmwater lakes. The Lake Ontario Fisheries Unit provides similar information about the fishery in Lake Ontario. The assessment effort needs to be maintained and improved where possible to ensure that the data are available for the district to make rationale management decisions. This is especially true in the warmwater lakes where the major sport species are being harvested at or near capacity.

2.5 ISSUES AND PROBLEMS

There are a number of issues and problems associated with the management of the fisheries resources of the Lindsay District. To facilitate discussion of these issues and problems, the fisheries resources have been divided into the sport fishery, the commercial fishery, and provincially rare and endangered fish species.

2.5.1 Sport Fishery

The sport fishery includes the inland warmwater fishery, the inland coldwater fishery and Lake Ontario fishery. The problems and issues associated with these fisheries have been grouped into nine categories which will be summarized in the following sections.

2.5.1.1. Level of Exploitation (High Priority)

There are two issues associated with the level of exploitation on the warmwater fishery. First, any significant increase in angling effort for walleye, muskellunge, and bass could result in overharvest which will reduce angling quality, i.e. smaller fish and/or fewer fish. It is unrealistic to expect the lakes and rivers to produce significantly more sportfish. Second, coarse fish such as carp, suckers and bullheads are not being harvested to potential. Management efforts should be promoting the harvest of these other species.

The coldwater fishery for resident brook trout and brown trout is not in danger of overharvest because access on private land is limited. As demands for fishing opportunities increase, efforts will be required to open up more areas to fishing. If increased effort in areas open to the public causes overharvest of the resident species, special regulations (e.g. size limits, artifical lure only, etc) may be required to maintain a quality fishery.

The trout season in Division 6 ends September 15 and in Division 4 on September 30 to protect fall spawning brown trout and brook trout. An extended fall season for brown trout and rainbow trout exists on all streams in the Regional Municipality of Durham and Northumberland County from Highway 2 to Lake Ontario to allow for additional fishing opportunities in areas which are not considered good spawning sites.

Since there is no closed season for chinook salmon and coho salmon, anglers are allowed to fish for these species above Highway 2 until the winter fishing closure takes effect on November 16. Therefore, fishing is taking place in the prime spawning areas at a time when brown trout, chinook salmon and coho salmon are actively spawning. Since, successful natural reproduction for brown trout, chinook salmon and coho salmon has been documented on several of these streams, there is concern about continuing to allow angling in these areas during the spawning period.

The coldwater stream fishery for lake-run fish and the fishery in Lake Ontario are not being used to potential because access is limited and many fish are released because of contaminant levels.

2.5.1.2 Nutrient Inputs (Eutrophication) (Moderate Priority)

Land use activities e.g. urbanization and agriculture, have greatly increased the amount of nutrients entering lakes and rivers. Present water quality must be maintained and or improved if possible to ensure the warmwater and coldwater fisheries are not lost.

The International Joint Commission (IJC) has identified 21 areas of concern throughout the Great Lakes where water quality problems exist. Port Hope harbour which is one of these areas is in the Lindsay District. The Ministry of Natural Resources is working with the Ministry of the Environment and the other agencies to develop Remedial Action Plans (RAPs) for these areas (including Port Hope Harbour) to rehabilitate the degraded water quality and fish habitat.

2.5.1.3 Physical Alteration of Fish Habitat (High Priority)

Activities such as dredging and filling wetlands; channelizing and constructing agricultural drains; constructing retaining walls, docks and boathouses; creating beaches by removing logs, removing aquatic weeds and dumping sand; building roads and causeways; and dredging navigation channels have resulted in a significant loss of warmwater fish habitat. All agencies must work together to protect and/or improve the remaining fish habitat to maintain the quality of fishing.

On coldwater streams agricultural activities, dam and pond construction and urban development have resulted in increased flooding, erosion, siltation, summer water temperatures and decreased summer water flows. These changes have reduced stream productivity. Since many fish species from Lake Ontario, e.g. rainbow trout and brown trout, use these tributaries as spawning and nursery areas and other resident fish species such as brook trout and brown trout spend their entire lives in the stream, any increase in these activities which would result in additional loss of stream productivity could have a major impact on the stream fishery as well as the Lake Ontario fishery. For the coldwater streams in the Regional Municipality of Durham, stormwater discharge, erosion, and sedimentation associated with urban development is a major concern. It is important that municipalities identify significant areas in official plans to ensure that any development will be carefully reviewed and fisheries concerns addressed.

In Lake Ontario, approximately 43% of the wetlands between Niagara and Presqu'ile have been lost and the remaining wetlands have been modified. Since wetlands are the most productive near shore fish habitats, the protection of the remaining wetlands is extremely important for maintaining the lake fishery.

The large size and relatively cold waters of Lake Ontario make it ideal for industrial cooling purposes. The largest user of lakewater for cooling and producer of waste heat is the electric power generating industry (Ontario Hydro). The least expensive and most efficient method of condensing the steam from thermal and nuclear generating stations is once-through cooling where large volumes of water are pumped through heat exchangers and returned to the lake. This process affects fisheries in two main ways. First, fish, larval fish and fish eggs are killed on intake screens (impingement) or during passage through the system due to physical damage and asphyxiation. Second, fish occurrence, behaviour, and metabolism may be affected by the elevated water temperatures of the discharge, and increased current.

2.5.1.4 Water Level Fluctuations (High Priority)

There are two major areas of concern regarding water level fluctuations on warmwater lakes and rivers. The first is related to the problem of winter fish kills. Winter kills have been a problem on Canal Lake, Mitchell Lake, Lake Scugog, Sturgeon lake, and Omemee Pond. On Mitchell Lake the problem was greatly reduced by creating a backflow by opening the valves in the gate at the canal entrance into Balsam Lake. On the other lakes, the problem of winter kill has been reduced by maintaining slightly higher levels throughout the winter.

The second area of concern is related to the maintenance of water levels and flows during the spring spawning period between April 1 and May 30. Water levels can fluctuate dramatically during this period. These fluctuations have been a problem in the fast water areas where walleye spawn (e.g. below Lock 19 in Peterborough). If water levels drop dramatically after the walleye have spawned, the eggs or fry may be exposed and subsequently die. However, to maintain water levels below the dam for the spawning period would reduce the water levels in upstream lakes and result in the mortality of eggs and fry of muskellunge and shoal spawning walleye, and impact on hydroelectric generation and navigation.

Water levels on warmwater lakes and rivers should not be allowed to fall during the critical period (April 1 to May 30) whenever and wherever possible. However, there will be years when this is not possible or areas where this is not possible. If chronic problems do occur other solutions such as physical changes to the habitat may be required.

Coldwater streams are formed and maintained by ground water springs. As development increases and demands for ground water increase, water levels and flows may be adversely affected.

Removal of water from the stream for irrigation or road maintenance has the potential to reduce the amount of habitat for fish. These practices usually take place during dry periods in summer when streams flows are low. Removal of additional water may crowd fish into shallow pools resulting in increased predation. Also, water temperatures could increase with the shallower water depths.

Interest in micro hydro generating systems, small hydro developments and other hydro developments has increased recently. It is imperative that any stream which is being considered for a system has sufficient water to run the generator and to maintain reasonable downstream flows, especially during low flow periods. Also, with streams which are used by lake-run fish for spawning and nursery areas, measures must be taken to ensure the smolt migrating downstream are not drawn into the turbines.

2.5.1.5 Introduction of Non-native (Exotic) Fish Species and Stocks (Moderate Priority)

The introduction of non-native fish species has had mixed results. Some introductions such as the stocking of walleye in the Kawartha Lakes were intentional to produce a more varied sport fishery. This introduction has created one of the most important fisheries in the Province. Other introductions which occurred by accident or with the help of anglers have had mixed results. Carp entered the Kawartha Lakes in the late 1800's and have established themselves throughout the system. Bluegills were first found in Rice Lake and are now found in many of the lakes and rivers. Although bluegills have had an impact on the abundance of pumpkinseeds they have had little impact on the quality of the fishery.

Other introductions could cause major problems. Northern pike have established a naturally reproducing population in Canal lake and one pike was confirmed from Stony Lake. Scientific evidence suggests that pike outcompete muskellunge. If more pike get into the warmwater lakes, the present high quality muskellunge fishery would be lost.

Black crappie have been found in Rice Lake in recent years. This species has been shown to cause a decline in the walleye population in other areas where it has been introduced. The situation in Rice Lake will be closely monitored to determine impacts of crappie on walleye.

Brook trout and Atlantic salmon were the original native stream salmonids in the Lindsay District; with Atlantic salmon restricted to Lake Ontario tributary streams. Lake trout and Atlantic salmon were native to Lake Ontario. Activities associated with settlement by Europeans, resulted in the extinction of Atlantic salmon by the late 1800's and lake trout by 1950's, and a reduction in the distribution of brook trout to the headwater sections of streams. With this reduction in numbers of native fish, many non-native fish such as rainbow trout, brown trout, chinook salmon, coho salmon and kokanee salmon were introduced to try to establish a suitable fishery. Rainbow trout and brown trout were able to establish self-sustaining populations. The other species are being maintained primarily by stocking programs with

limited natural reproduction. Also, a program to study the feasibility of introducing Atlantic salmon has been initiated on Wilmot Creek. Atlantic salmon will be stocked annually to try to establish a natural reproducing population.

Non-native fish species can cause major changes in native or established fish communities. Since impacts cannot be anticipated, introductions should be considered only after a thorough review of the alternatives and research concerning impacts on native species.

2.5.1.6 Contaminants and Acid Precipitation (Moderate Priority)

Although acid precipitation is falling on the Lindsay District watersheds, the high level of limestone in the bedrock and soils has enough buffering capacity to neutralize the acid before it can directly affect the fisheries. Lindsay District lakes and rivers should be out of danger for the foreseeable future. However, if more areas become affected by acid rain, anglers will move to unaffected lakes. This could increase fishing pressure in the Lindsay District.

Contaminant levels in fish from warmwater lakes and rivers tested in the Lindsay District are relatively low and only larger fish need be consumed in limited quantities. The lakes in the Crowe River watershed appear to have the highest levels of contaminants with Belmont Lake having some of the highest levels in the district. Mercury is the contaminant in most of the Kawartha Lakes which is responsible for the restrictions.

Polychlorinated biphenols (PCB's) have been identified as a contaminant in some fish in Rice Lake. Only the levels in large carp are considered to be a concern. All other species are safe to eat.

Contaminant levels in resident trout in the coldwater streams are low; making these fish safe to eat. However, the trout and salmon in Lake Ontario and lake-run trout and salmon in the tributaries contain a wide variety of chemicals. Some contaminants are at levels which are a concern from a public health standpoint. Levels of other contaminants have declined as much as 70% since the program began in 1974. Even with the reduction in levels of some chemicals, contaminants are still a high priority. The chemical burden in fish from Lake Ontario has resulted in a high release rate; a loss of sport fishing opportunities and wasted fish. Anglers should consult the booklet entitled, "A Guide to Eating Ontario Sport Fish" to determine the quantity of different sizes and species of fish which can be consumed.

2.5.1.7 Conflicts Between Users (Resource Allocation) (Moderate Priority)

Conflicts between recreational anglers and commercial fishermen are few in the Lindsay District because commercial fisheries occur only on two warmwater lakes (Sturgeon Lake and Rice Lake), commercial fishing

occurs only in the winter and spring before the angling season opens, and the commercial harvest is restricted mainly to coarse fish species such as carp and bullheads.

In the past,native people have not been given special fishing rights to fish off the reserves. However, some native people believe they do have special privileges. This has resulted in numerous complaints especially during the winter on Pigeon lake, Rice Lake and the Otonabee River. Charges have been laid but the problem still exists. The Ministry of Natural Resources is presently negotiating with native people to resolve this conflict.

A potential conflict could arise between resident anglers and tourist operators. This became evident in 1980 when the Ministry had meetings to discuss the establishment of fast water sanctuaries and a reduction in the length of the fishing season. Some tourist operators were opposed to spring fastwater sanctuaries because some business would be lost, and local anglers were opposed to a reduction in the fall season because this was the time of year when locals could fish without competition from tourists. If further restrictions in effort are required in the future this conflict could increase in importance.

With an increase in the number of tournaments and derbies each year a conflict between professional anglers and recreational anglers could arise. If overexploitation becomes a problem on the warmwater lakes, controls on the tournament and derby anglers and/or recreational anglers may be required. This may lead to conflicts between these groups for the available sportfish.

Many of the conflicts on the coldwater streams are associated with the fishery for lake-run fish. A conflict exists between anglers wanting more of the Lake Ontario tributary streams opened to lake-run fish and anglers who enjoy fishing for resident brown trout and brook trout. In the Lindsay District many sections of the tributaries of Lake Ontario are presently open to lake-run fish. Therefore, it must be decided if additional sections should be opened to lake-run fish.

Another conflict exists between anglers wanting chinook salmon stocked in district streams and anglers wanting these streams left for lake-run rainbow trout and brown trout. This is an issue on the Ganaraska River in Port Hope. The pro-salmon anglers want chinook stocked in the streams in the Lindsay District to improve the lake fishery during the present slow period between mid-August and mid-September when present chinook stocks are returning to their stocking sites. The anti-salmon anglers are concerned about the impacts on the river fishery of unethical anglers who are attracted by large runs of salmon, the problem of rotting fish carcasses which will develop with an increased stocking of chinook salmon, and the impacts on other fish species.

Fish managers believe Lake Ontario is being stocked at or near the maximum allowable level. If anglers want additional fish stocked in other locations or new strains introduced, a relative reduction in the

number of the same species in other locations or in the number of another species will be required. This has the potential of creating numerous conflicts.

2.5.1.8 Insufficient Scientific Knowledge and Lack of an Adequate Data Base (High Priority)

Aquatic ecosystems which include fish communities are very complex and constantly affected by man's activities. Various types of data concerning these ecosystems are required for fisheries managers to accurately determine the condition of the various fish populations and determine appropriate management actions. Fisheries managers lack the scientific knowledge required to determine reliable estimates of fish numbers, growth rates, mortality rates, seasonal distribution and how different species interact with one another and their environment. These data, along with improved estimates of the number of fish harvested are required to develop adequate yield prediction models which could be used to determine safe harvest levels for individual fish species.

The numbers of different species of fish within a water body can change significantly from year to year depending on environmental conditions such as water temperature and water flow. Many of these conditions are out of man's control. Therefore, long term data collection programs are required to determine the natural variability in fish populations and to determine the impact of man's activities on the fisheries resources.

The establishment of fisheries assessment units was a major step in the development of a program to establish long-term data bases for various types of fish communities. In the Lindsay District, the Kawartha Lakes Fisheries Assessment Unit was established to collect long-term data concerning warmwater fish communities which contain walleye, muskellunge, bass and panfish. Also, the Lake Ontario Fisheries Assessment Unit is presently developing programs to establish long-term data bases for the Lake Ontario fishery. If assessment units and districts are to maintain high quality long-term data collection programs which are necessary to effectively manage the fisheries resources, funding must be maintained and increased where possible.

2.5.1.9 Lack of Public Awareness (High Priority)

There is a lack of understanding among the public and user groups regarding the complexity of managing the fisheries resources. This results in unrealistic expectations with regards to the ability of the resource to produce fish and provide fishing opportunities, and with regards to the impacts the public have on the resources.

The public are often not aware of the impacts development has on the fish resources. More effort should be made to educate the public to ensure significant habitat is not destroyed.

2.5.2 COMMERCIAL FISHERY

2.5.2.1 COMMERCIAL FOOD FISHERY

The commercial food fishery has not created significant issues and problems in the Lindsay District for the following reasons: commercial fisheries are present only on Sturgeon Lake and Rice Lake; activities take place only in late fall, winter and early spring when seasons for recreational anglers are closed; the gear used is highly selective so few non-target species are harvested; and the harvest is restricted mainly to coarse fish species such as carp and bullheads which are of little interest to anglers.

The present harvest (14,800 kg) is substantially below the target (71,580 kg) which is the quota allocation. Most of the short fall is in the carp harvest which is substantially below the quota (55,000 kg). Carp are not being harvested to potential because markets have been poor, Rice Lake carp have had high contaminant levels, (PCB's) and ice conditions during the winter fishery have been poor.

Since coarse fish species such as carp are found in other inland warmwater lakes in the district and are not being harvested to potential, the possibility of allowing additional commercial licences for carp and other coarse fish on other lakes and other selective methods of harvesting coarse fish, e.g. electrofishing boats would be considered.

A commercial food fish industry does not exist in the waters of Lake Ontario fronting the Lindsay District. Several requests in recent years for gill net licences have been refused for the following reasons: commercial catches in this area have been traditionally low, commercial fishermen licenced for this area have done little fishing, and a major sport fishery based on good natural reproduction and stocking has developed in the area. Also, contaminant levels would restrict the sale of some of the commercially harvested fish.

The district may consider a temporary experimental permit to investigate the feasibility of using entrapment gear (trap nets) to catch species which are not being harvested by recreational anglers.

2.5.2.2. COMMERCIAL AQUACULTURE INDUSTRY

At present no commercial aquaculture stations are operating on Lindsay District warmwater lakes or rivers. However, with the proposed changes to the Ontario Fisheries Regulations to increase the number of fish species which private operators will be able to propagate and sell for food, new facilities may be constructed in the future.

An issue in the last few years is the request by private fish farmers to catch wild bass to be used as broodstock for developing their own broodstock. As fish farmers will soon be able to propagate and sell other warmwater species such as walleye, yellow perch, and bullheads, a

need will arise for a source of wild broodstock to develop additional broodstocks. Controls will be required to ensure this is done in a fair and biologically safe manner.

Three aquaculture operations are producing fish on coldwater streams in the Lindsay District (Figure 2). As outlined above, changes to the Fisheries Regulations and improvements in technology will probably result in construction of additional facilities in the district. The new facilities have the potential to increase downstream water temperatures, increase nutrient inputs and introduction of exotic species or stocks into the streams. It is imperative that a detailed assessment of each project is undertaken to ensure the quality of the coldwater streams is maintained.

There is only one aquaculture operations adjacent to Lake Ontario in the Lindsay District. The ponds at the Wesleyville electric power station (not in operation) are being used to rear rainbow trout and yellow perch. However, as interest in this industry increases there may be more demand to set up cage culture operations and other operations which could use the warmwater from electric power stations to culture fish.

2.5.2.3 COMMERCIAL BAITFISH FISHERY

In the past, baitfish harvest areas in the Lindsay District were allocated using both "block zones", and all or sections of waterbodies. Overlap of licence areas occurred in several areas. A study of the commercial baitfish fishery was conducted in 1980, to document the nature of the commercial baitfish industry and to identify where and how management of this resource could be improved.

The study identified the most active harvesters, areas of potential over-harvest or underuse and possible conflicts resulting from multiple licencing on specific areas. Based on the 1980 study, the District implemented a re-alignment of the commercial harvest licences for the 1981 season. This eliminated much of the overlap in licence areas as individual watercourses were allocated to a single licence where feasible.

Although this system has been in place since 1981, further changes are required because baitfish production is below potential. Baitfish production is below potential for the following reasons: most land in the district is privately owned and harvesters may not be given permission to harvest minnows; the present policy of one harvester per area is restricting harvest of enclosed dug out ponds by landowners; and some harvesters are putting little effort into catching baitfish in their licenced areas.

Some harvesters and dealers have difficulty catching or buying minnows at certain times of the year. An effort is required to determine when these shortages occur and to determine where in the district or province surplus minnows could be available to supply the demand.

Some coldwater streams have been licenced for baitfish harvest. However, other streams such as Wilmot Creek have not. A more consistent approach is required with regards to coldwater streams.

No baitfish permits have been issued for Lake Ontario. This policy is presently under review. Many Lake Ontario tributary streams are being harvested by bait harvesters.

2.5.3 PROVINCIALLY RARE AND ENDANGERED FISH SPECIES

Rare and endangered fish species include those species which have been identified by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and those afforded protection under the Endangered Species Act. The lake sturgeon which is found in lake Ontario has been reviewed by the Committee on the Status of Endangered Wildlife in Canada and has not been given any status. Although it is rare in Lake Ontario, it is more common in other parts of the province. The status of the lake sturgeon and other species will be monitored and appropriate action will be taken if additional rare and endangered species are identified.

3.0 FISHERIES MANAGEMENT DIRECTION

The purpose of this section is to identify the management direction as outlined in the objectives and targets provided through SPOF, the Southern Ontario Coordinated Program Strategy, and the Lindsay District Land Use Guidelines; and to present the strategies and tactics necessary to address the management problems and achieve the objectives and targets.

3.1 General Fisheries Management Objectives

The general objective for fisheries management in Southern Ontario is as follows:

To provide opportunities for recreation and economic benefits consistent with the maintenance of healthy fish communities.

3.2 Specific Fisheries Management Objectives, Targets, Strategies and Tactics

The Lindsay District Land Use Guidelines identify objectives and targets for the sport fishery, commercial food fishery, commercial baitfish fishery, and provincially rare and endangered fish species.

The Lindsay District Fisheries Management Plan contains the same objectives and targets. However, it also has more specific targets for the different sport fisheries. The objectives and targets will be discussed in detail in the following sections.

3.2.1 Sport Fishery

3.2.1.1 Sport Fishery Objective.

To meet demand within the limits of a wisely managed and rehabilitated resource.

3.2.1.2. Sport Fishery Targets

To provide 850,000 angler-days of recreational opportunities and 670,200 kg of fish annually by the year 2000.

The sport fish target in the Lindsay District Land Use Guidelines (1983) was set at 3,400,000 opportunities. It also stated in that document that one angler-hour constituted one occasion (opportunity). Assuming one angler-day equals four angler-hours, and one angler-hour equals one opportunity, then 3,400,000 opportunities equal 850,000 angler-days.

The District Fisheries Management Plan planning manual (1986b) specifies that sport fishery targets should be expressed as angler-days of recreational opportunities and kg of fish harvested. Therefore, the sport fish targets for the fisheries management plan are to provide 850,000 angler-days of fishing and 670,200 kg of fish annually by the year 2000. These sport fish targets were calculated by summing the targets for the following three distinct types of fisheries which are present in the Lindsay District: the inland warmwater fishery, the inland coldwater fishery, and the Lake Ontario fishery (Appendix I).

The sport fish catch standard target used in the Lindsay District Land Use Guidelines was set at 0.57 kg of fish/angler-day. The catch standard target set for the fisheries plan has been set at 0.79 kg of fish/angler-day. This increase in the target reflects the anticipated development of the Lake Ontario sport fishery.

Table 1 shows the current use as 560,800 kg of fish harvested and 773,500 angler-days of fishing opportunities. Table 1 also indicates that the potential yield from the fisheries resources has the capability to support the projected use of 727,900 kg of fish and 938,000 angler-days by the year 2000. However, the target (850,000 angler-days) which is higher than current use is less than the projected use for the following reasons: the inland warmwater sport fishery is presently harvested at capacity except for coarse fish; the coldwater stream fishery for resident fish has little room for expansion because access on private land is limited; and the coldwater stream fishery for lake-run fish and the Lake Ontario fishery although capable of supporting the additional effort, will not make up the difference in the short term because access is limited, expensive equipment (e.g. large boats) is required to use the open lake resource, and larger fish have high contaminant levels.

3.2.1.3 Inland Warmwater Fishery Targets

To provide 645,000 angler-days of recreational opportunities and 467,200 kg of fish annually by the year 2000.

The original sport fish in the inland warmwater lakes were muskellunge and bass. From the early 1920's to the mid-1950's walleye (yellow pickerel) eggs and fry were widely introduced in most lakes. As this new species adapted well to its new environment, walleye populations increased rapidly through natural reproduction and further stocking was discontinued. The walleye is presently the most preferred species and is second only to panfish in weight harvested.

The Lindsay District inland warmwater lakes continue to provide an exceptionally good warmwater fishery for walleye, muskellunge, largemouth bass, smallmouth bass and panfish. This fishery supports a total angling effort of 637,800 angler-days which equals 12.9 angler-days per hectare per year (angler-days/ha/yr). This is high when compared to other important warmwater fisheries in Ontario. The current harvest of warmwater species in the Lindsay District is estimated to be 456,300 kg or 9.2 kg/ha/yr. The harvest of walleye is 3.47 kg/ha/yr.

These values are also high when compared to other warmwater fisheries. Since each lake has maximum number of fish it can produce, and the warmwater lakes are producing large numbers of fish and receiving heavy fishing effort, it is unrealistic to expect the lakes to produce significantly more sport fish. The present fishery is providing 0.7 kg/angler-day and is above 0.5 kg/angler-day which is identified as the average catch standard for warmwater fisheries (OMNR, 1986a).

To reach the targets of 645,000 angler-days and 467,200 kg, more effort must be directed to coarse fish such as carp, bullheads, and suckers. The present harvest of coarse fish (13,500 kg) is substantially lower than the estimated potential available to the sport fishery (56,400 kg). Increasing interest in these fish may be difficult.

In 1980, fisheries staff began an intensive review of the walleye fishery and management needs with emphasis on the adequacy of existing fishing regulations. Anglers were complaining that although good numbers of walleye were available, the fish were small.

It appears that the walleye fishery in many of the Kawartha Lakes has exhibited a classic response to the introduction of this species to new waters and the subsequent heavy fishing pressure which results - an abundance of small fish and a decline in the number of older, larger fish after the walleye populations stabilized.

The public wanted the district to start stocking walleye and to implement minimize size limits to increase the number of larger fish in the angler's catch. Experience in other jurisdictions indicated that stocking of juvenile walleye will contribute little to increasing the number of larger fish when natural reproduction is good and fishing pressure is high. Also, size limits will also be ineffective and may

result in an increase in the number of walleye below the size limit and no increase in the number of larger fish. In fact, the increase in numbers of small fish below the size limit may result in intense competition for food and cause a reduction in growth rates.

To attempt to halt or reverse the apparent trend toward smaller fish, a reduction in fishing effort and harvest was chosen as the most logical management alternative. By reducing the angling effort when large walleye are most vulnerable in the spring and fall, it was felt a better quality fishery could be produced over the major part of the angling season. Accordingly in 1982, 15 fish sanctuaries at designated fast-water and river spawning areas were extended for an additional week - to the third Friday in May. Also, the fishing season for all species of fish in the Kawarthas was closed two weeks earlier on November 16.

At public meetings dealing with the regulation changes, it was emphasized that immediate results were not expected. It was suggested that a least 5 or 6 years may be required to evaluate the success of the program. To date, the assessment has shown that there has been no further decrease in the average size. However, there has been no noticeable increase. Monitoring will continue in order to properly evaluate the success of the program.

The Lindsay District has just implemented a new walleye spawning site rehabilitation program which is funded from the resident angling licence money. This program which will be carried out over the next few years, will involve the placement of good quality rubble in the fast water spawning areas to ensure optimum natural reproduction. Important shoal spawning areas will also be considered. This program is expected to maximize natural reproduction wherever possible, and assist in meeting the increased demand in the future.

3.2.1.4 Inland Coldwater Fishery Targets

To provide 4,400 angler-days of recreational opportunities and 1,800 kg of fish for the resident fish and 125,600 angler-days of recreational opportunities and 51,200 kg of fish for the lake-run fish, annually by the year 2000.

There are no inland coldwater lakes in the Lindsay District. Therefore, the following discussion will be concerning inland coldwater rivers and streams.

At present, resident brook trout and brown trout are found in most coldwater streams. The Lake Ontario tributaries have self-sustaining lake-run rainbow trout, and populations of lake-run brown trout, coho salmon and chinook salmon which are maintained mainly by stocking. Several of these species are also reproducing successfully on some of the better quality streams (e.g. Wilmot Creek). Pink salmon which were accidentally introduced into the Great Lakes are reproducing successfully in several Lake Ontario tributary streams. Also, the Ontario Ministry of Natural Resources has just initiated a program to re-establish Atlantic salmon into Lake Ontario tributaries.

Lindsay District presently has 168 ha of coldwater streams. Lake-run fish have access to 264 km which leaves 191 km restricted to resident fish. The fishery for resident fish is estimated to provide 4,400 angler-days of recreation and provide 1,800 kg of fish. Although it appears that this fishery is being harvested to potential, the estimates are based on little data. Therefore, more data are required before an accurate assessment of the fishery can be made. With most of the land along the stream under private ownership, it would be expected that the resource would be harvested below potential because of restricted access.

The fishery for lake-run fish supports substantially higher fishing effort (108,300 angler-days) and harvest (44,300 kg) than the resident fish fishery. The resource appears to have the potential to support the level of activity which is anticipated by the year 2000 (125,600 angler-days and 51,200 kg). However, this will only occur if no further posting of private property occurs; and/or more sections of stream are opened to the public through purchase of easements or land, etc.; and/or more areas are opened to fishing all year. The present resident and lake-run fisheries are producing 0.4 kg/angler-day which is above the 0.2 kg/angler-day identified as the average catch standard for inland coldwater fisheries (OMNR, 1986a).

There is some pressure to provide additional access for lake-run fish to sections of coldwater streams which are restricted to resident fish. The sections presently open to lake-run fish have the capability to support the level of activity required to the year 2000. Resident fish fishing opportunities appear to be more restricted due to private ownership than lake-run fishing opportunities. Therefore, the Lindsay District staff recommend that no further expansion of access for lake-run fish should be allowed at this time.

3.2.1.5 Lake Ontario Fishery Targets (Lindsay District Waters)

To provide 75,000 angler-days of recreational opportunities and 150,000 kg of fish annually to the year 2000.

The current use of the Lake Ontario fishery (23,000 angler-days and 58,400 kg) fronting the Lindsay District is substantially less than the potential yield (249,000 kg). The resource could support substantially higher use. However, the targets (75,000 angler-days and 188,000 kg) are lower because access to the resource is restricted, equipment to use the resource (e.g. large boats) is expensive, and between 40% and 70% (depend on the species) of the fish are released because of contaminants. The present fishery is providing 2.5 kg/angler-day and is above 2.0 kg/angler-day which is the average catch standard for Lake Ontario.

The present fishery for rainbow trout in the Lindsay District is maintained primarily by natural reproduction; and the lake trout, chinook salmon, coho salmon and lake-run brown trout although maintained primarily by stocking are showing evidence of some natural reproduction. Ontario and New York State are presently stocking approximately 8

million salmonids in Lake Ontario to maintain the fishery. The chinook salmon, and coho salmon are stocked to produce a put-and-delayed-take fishery. The lake trout and brown trout are being stocked to re-establish naturally reproducing populations; with the long term goal to develop populations which will be maintained in part by natural reproduction. Atlantic salmon are also being stocked in Lake Ontario by New York state and Ontario. The Ontario program is a feasibility study to determine if conditions in Lake Ontario and its tributary streams are still suitable for Atlantic salmon to establish naturally reproducing populations. The Credit River in Maple District and Wilmot Creek in Lindsay District are the two candidate streams.

In the Lindsay District waters of Lake Ontario, lake trout are stocked in Port Hope (100,000 yearlings) and Cobourg (100,000 yearlings) as part of the rehabilitation effort; brown trout are stocked at Port Hope (20,000 yearlings) and Oshawa (15,000 yearlings); chinook salmon are stocked in Oshawa (25,000 fingerlings), Bowmanville (25,000 fingerlings) and Cobourg (15,000 fingerlings); and Atlantic salmon in Wilmot Creek (10,000 yearlings). The Ministry of Natural Resources and New York State have agreed not to stock beyond the current targets for salmonids in Lake Ontario because the current harvest appears to be approximately equal to the potential yield and the full impact of the present stocking program on the forage fish has not been determined. Therefore, if additional stockings are made in Lake Ontario, the fish will either be relocated from another area or be stocked with a relative reduction in the number of another species presently being stocked. Many anglers in the Lindsay District want chinook salmon stocked and the number of lake trout reduced. For lake trout this can only be done through negotiations with New York State.

The sea lamprey control program in tributary streams is one of the main factors which have contributed to the creation of the excellent Lake Ontario fishery. The continuation of this Federal program is essential if this fishery is to be maintained.

3.2.1.6 Sport Fishery Strategies and Tactics

Strategies and tactics are developed to address issues and problems to ensure that objectives and targets are met. Section 2.5.1 identifies the nine groups of issues and problems which have been identified for the sport fishery in the Lindsay District. The following are the strategies and tactics which have been developed to address each of the issues and problems associated with the sport fishery. Some of the strategies and tactics may apply to one, two or all three of the types of fisheries within the Lindsay District (inland warmwater, inland coldwater or Lake Ontario). However, the details as to the types of fisheries or the waterbody where the tactics apply will be presented in detail in Section 4.0. The strategies and tactics are <u>not</u> listed according to importance or priority.

3.2.1.6.1 Level of Exploitation

1. Use harvest controls to ensure efficient use of the fisheries resources and protect natural reproducing fish populations by:

   - retaining present harvest controls (season length, catch and possession limits, size limits, and sanctuaries) to maintain present fishing quality.
   - imposing additional harvest controls only if required to maintain fishing quality (after public consultation).
   - increasing the number and/or length of Lake Ontario tributary streams open to all year fishing for rainbow trout and brown trout.
   - investigating the feasibility of closing Lake Ontario tributary streams upstream of Highway 2 to fall fishing for Pacific salmon.
   - introducing a slot size limit where lake trout between 63 and 76 cm must be released.

2. Control illegal harvest to protect existing fisheries by:

   - developing an enforcement plan to assist with priority rating enforcement requirements and directing effort to areas of most need.
   - continuing to solicit assistance from other enforcement agencies (e.g. Ontario Provincial Police, local police departments, etc).
   - maintaining enforcement effort or increasing as required through additional conservation officers and/or deputy conservation officers.
   - investigating the feasibility of changing the opening time and date of trout season to reduce enforcement problems and increase the number of legitimate fishing opportunities (e.g. a midweek noon opening).

3. Use stocking to rehabilitate and/or supplement native and/or naturalized fish species by:

   - maintaining annual stocking levels of muskellunge fry and fingerlings pending the results of stocking assessment.
   - maintaining annual stocking levels of lake trout in Lindsay District waters of Lake Ontario as required for rehabilitation on a lake wide basis.
   - increasing annual stocking levels of brown trout in Lindsay District waters of Lake Ontario to at least 50,000 yearlings, depending on production capability.
   - reviewing and approving Community Fisheries Involvement Program culture applications on case by case basis and allow only projects which are consistent with sound fisheries management.
   - continue to support the experimental management program to establish naturally reproducing Atlantic salmon populations in Lake Ontario tributary streams
   - maintaining present adult fish transfers over obstructions to enhance fish populations.

4. Use stocking to provide additional angling opportunities by:

   - increasing annual stocking levels of chinook salmon in the Lindsay District waters of Lake Ontario to at least 100,000 fingerlings, depending on production capability.
   - encouraging private fish farmers to construct fish out ponds where the public pay a fee.
   - continuing to purchase rainbow trout from private fish farmers to annually stock the Provincial Fishing Area ponds.
   - reviewing Community Fisheries Involvement Program culture application on a case by case basis and allow only projects which are consistent with sound fisheries management.

5. Improve public access to inland and Lake Ontario fisheries by:

   - developing an access plan to priority rate access needs.
   - improving existing access sites on crown land by upgrading facilities.
   - working with individuals, interest groups, other agencies and/or municipalities to upgrade existing access sites and/or build new sites through financial incentives and cost sharing programs.
   - acquiring and developing new access points.
   - supporting acquisition programs by individuals, interest groups, other agencies and/or municipalities where access to the fisheries will be provided.
   - supporting non-profit fish derby or tournament organizations which provide funding to develop new access facilities.
   - negotiating easements or agreements with private landowners to provide access to anglers.
   - working with angler organizations and private landowners to encourage fishing access on private land.
   - establishing a committee with anglers and landowners to discuss access problem, to identify landowner concerns, and to develop options which could be used to encourage landowners to provide access to anglers.
   - promoting the location and facilities available at existing access points.

6. Direct fishing effort to underharvested fish species by:

   - promoting the use of alternate species (e.g. carp, suckers and bullheads) through special education programs.
   - establishing bowfishing seasons for carp.
   - encouraging derbies directed at coarse fish such as carp bullheads and suckers.

3.2.1.6.2 <u>Nutrient Inputs (Eutrophication) and Physical Alteration of Fish Habitat</u>

1. Protect water quality and fish habitat by:

- maintaining and increasing as required enforcement of existing legislation to maintain and/or improve water quality and fish habitat.
- assisting other agencies in the enforcement of their legislation to maintain and/or improve water quality and fish habitat.
- implementing the federal Department of Fisheries and Oceans policy for the management of fish habitat, including the principle of net gain/no net loss of fish habitat, i.e., attempt to balance unavoidable loss of habitat with replacement and improvement of habitat on a project-by-project basis.
- working with conservation authorities, other provincial agencies (e.g. Ontario Ministry of the Environment, Ontario Ministry of Agriculture and Food,) other federal agencies (e.g. Department of Fisheries and Oceans, and Environment Canada), the Great Lakes Fisheries Commission and International Joint Commission to ensure that critical fish habitat is identified and receives recognition and protection.
- working with municipalities to ensure that official plans, official plan amendments, and zoning bylaws afford protection to fisheries and to encourage municipalities to accept the responsibility of the maintenance of stormwater control structures and streambank stabilization projects.
- working with landowners, developers and real estate representatives to increase awareness of the impacts of land use activities on fisheries resources and the economic and recreational benefits of healthy fisheries.
- regulating the timing of water related development activities according to the species present and the importance of the area.
- minimizing disturbances from land use practices along watercourses (e.g. agricultural and development activities) by retaining or establishing vegetated buffer zones in accordance with the Central Region Guidelines (OMNR, 1987e).
- requiring erosion and sedimentation controls during and after construction on all development activities to reduce siltation of watercourses.
- prohibiting the direct inflow of untreated stormwater into watercourses and ensure that stormwater treatment and control reflects current technology, i.e. source control of stormwater, retention/detention facilities, landscape design, and that control ponds be designed to detain at least 125 m^3/ha runoff from development sites for at least 12 hours, and/or be capable of removing particles down to 40 microns in size.
- strongly discourage the dredging and channelization of watercourses and where channelization is unavoidable, ensure mitigative measures are implemented (e.g. 2:1 slopes, sedimentation control and provisions for fish passage).
- prohibiting the construction of instream ponds which will affect critical fish habitat (e.g. headwater areas and spawning areas).
- acquiring land through purchase, or supporting the acquisition of land by other agencies (e.g. Conservation Authorities).
- implementing existing guidelines for wetlands management and wetlands policy to protect wetlands which are important to the fisheries resources.

2. Rehabilitate degraded water quality and fish habitat by:

- assessing rehabilitation needs and setting priorities.
- initiating rehabilitation projects on critical habitat (e.g. spawning and nursery habitat).
- initiating rubble placement projects at walleye fast water and shoal spawning sites.
- encouraging and assisting other agencies (e.g. Trent-Severn Waterway and Conservation Authorities) and municipalities with rehabilitation projects.
- encouraging and assisting through Community Fisheries Involvement Program, landowners, private interest groups and angler groups with rehabilitation projects.
- encouraging landowners to removal instream dams to reduce downstream water temperatures.
- supporting the conversion of dams by landowners from surface draw to bottom draw on coldwater streams to reduce downstream water temperatures.
- working with the International Joint Commission to develop a Remedial Action Plan (RAP) for Areas of Concern.

3. Create new fish habitat by:

- assessing where habitat is limiting and setting priorities.
- initiating projects where habitat is limiting (e.g. new spawning channels, artificial reefs, etc)
- promoting fish habitat creation projects by other agencies (e.g. Conservation Authorities)
- promoting fish habitat creation projects by interest groups or landowners through Community Fisheries Involvement Program.

4. Assist all major users of water to minimize fish mortalities due to impingement on intake screens and destruction in pumps at all intakes by:

- initiating and/or refining programs to accurately monitor numbers, weights, condition, age, etc., of impinged fish.
- continuing to promote experimentation with intake designs to minimize fish impingement and construction of new intakes to state-of-the-art standards.
- recommending upgrading existing facilities as new designs and information become available.
- continuing to promote the elimination of use of tempering water or where not acceptable continuing to promote experimentation with pump design to minimize damage to fish.
- investigating the need for users to replace or pay for replacement of significant fish losses due to entrainment, and impingement.
- obtaining information on water volumes taken, design and location of water intakes for all users in Lake Ontario and assessing their local and combined impacts on the aquatic community.

5. Assist all major users of water to minimize larval fish and egg mortality due to entrainment at all major water intakes by:

   - recommending that users minimize cooling water requirements and revise Ministry of the Environment requirements accordingly.
   - requiring users to locate intake structures beyond the nearshore zone away from existing and potential spawning and nursery areas.
   - initiating programs to assess the entrainment mortality of larval fish and fish eggs to determine impact on the fish community.
   - promoting studies by users to determine optimum cooling water flows and temperature change combinations to minimize entrainment and thermal discharge stresses at each plant based on previous recommendations.

6. Assist all major users of cooling water to assess and minimize negative fisheries impacts associated with thermal discharge from all sources by:

   - requiring users to delineate the year-round zones of influence of thermal plumes.
   - encouraging users to use thermal plume models for predicting potential environmental impacts at future generating station sites.
   - encouraging users to conduct studies of the northshore littoral community to determine fisheries impacts in zones of thermal influence for evaluating impacts of proposed increases in thermal discharges.
   - discouraging the exemptions from the Environmental Assessment Act of any facilities with major thermal discharges.
   - promoting long-term studies in the areas affected by thermal discharges so that subtle environmental modifications are detected.
   - promoting preoperational assessments to address the cumulative effects of future generating facilities and the combined affects with other human waters uses on the nearshore ecology as well as the additive effects of each individual plant.
   - promoting experiments to determine potential effects of discharge temperatures and currents on migratory patterns of fish.
   - requiring future thermal discharge outfalls to be placed offshore beyond the littoral zone (approximately below 10 m) and to incorporate the offshore diffuser technology used at the Darlington Nuclear Generating Station.
   - preventing further interruptions of alongshore movements of water, sediment, and fish due discharge currents or intake/discharge structures.
   - conducting creels to determine angler catch and effort at facilities within the zone of influence of thermal plumes.

3.2.1.6.3 <u>Water Level Fluctuations</u>

1. Protect fisheries from water level fluctuations by:

   - monitoring water levels on lakes and rivers to identify specific problems and determining magnitude.

- working with other agencies involved in water level control (e.g. Trent-Severn Waterway and Conservation Authorities) and water use (e.g. Ontario Hydro) to reduce or eliminate impacts on fish production and reproduction.
- developing and implementing comprehensive water level control guidelines so other agencies are aware of critical areas and required water levels.
- ensuring applications for microhydro generating systems, small hydro developments and other hydro developments are carefully reviewed to ensure minimal impacts on fisheries.
- maintaining and increasing as required enforcement effort to control problems., e.g. illegal dams.
- ensuring dam owners are aware of the potential impacts of dam operations.

2. Rehabilitate fisheries which are affected by water level fluctuations by:

   - reconstructing and/or replacing habitat to reduce impacts.
   - promoting rehabilitation projects by other agencies and municipalities.
   - promoting and assisting rehabilitation projects by private interest groups, angler groups, and landowners through Community Fisheries Involvement Program.

3.2.1.6.4 Introduction of Non-native (exotic) Species and Stocks.

1. Protect existing fisheries from introduced fish species and stocks by:

   - maintaining and increasing as required enforcement of existing regulations against the moving of fish from waterbody to waterbody.
   - restricting access by using existing barriers or constructing new barriers (e.g. lake-run salmonids into resident brown trout and brook trout waters, and northern pike into warmwater lakes).
   - regulating private aquaculture industry to ensure captive stocks are not released into public waters.
   - identifying non-native species of concern or interest.
   - conducting netting studies to determine abundance of northern pike.

2. Reduce impacts of introduced undesirable species or stocks by:

   - encouraging selective harvest to reduce numbers.
   - developing specific programs to control/eradicate introduced (exotic) fish (e.g. northern pike)
   - supporting the use of lampricides and the construction of low-head barrier dams by Sea Lamprey Control to control the production of sea lamprey.

3. Investigate the feasibility of introducing new species or strains to provide additional recreational opportunities:

- review the literature on results of introduction programs in other areas.
- monitoring the success of introductions in other areas (e.g. Skamania in Lake Huron).

3.2.1.6.5 Contaminants and Acid Precipitation

1. Protect fisheries from contaminants and acid precipitation by:

- maintaining and increasing as required enforcement of existing regulations to prevent contamination.
- assisting Ontario Ministry Of Environment and other agencies in the enforcement of their legislation to prevent contamination.
- assisting Ontario Ministry Of Environment and other agencies in detecting and controlling sources of contamination.
- supporting research programs by Fisheries Research and other agencies to study impacts of contaminants and acid precipitation.
- continuing to assist Ontario Ministry Of Environment with the collection of fish samples for contaminant analysis.

3.2.1.6.6 Conflicts between users (resource allocation)

1. Deal with conflicts between users and allocation of the fish resources by:

- assessing needs of users to determine if conflicts are real or perceived.
- reviewing information from other districts and outside agencies regarding other conflicts and their resolution.
- basing the allocation on potential yield, approved fisheries management plans, sound fisheries management and user demand.
- encouraging users to meet with each other to resolve the conflicts.
- continuing to support the negotiations to resolve the question of native fishing rights.

3.2.1.6.7 Inadequate scientific knowledge and lack of an adequate data base.

1. Assess information requirements by:

- reviewing background information to identify where more information and research are required.
- priority rating information and research needs at the field level.
- determining if district, assessment units, or research should conduct studies.
- reviewing information from other districts, assessment units and outside agencies.

2. Maintain and/or enhance the fisheries assessment program by:

- updating the basic inventory data as required (all major waterbodies have been inventoried at least once).
- conducting long-term studies through the Kawartha Lakes Fisheries Assessment Unit including index netting, tagging, creel surveys and/or radio telemetry to determine and monitor fishing effort, harvest and the status of fish populations on type lakes.
- conducting index netting, tagging, and/or radio telemetry studies to determine and monitor fishing effort, harvest and the status of fish populations on warmwater lakes other than Kawartha Lakes Fisheries Assessment Unit type lakes.
- conducting index creel surveys on warmwater lakes other than Kawartha Lakes Fisheries Assessment Unit type lakes.
- continuing stocking assessment programs for muskellunge.
- conducting walleye shoreline and shoal spawning assessment projects to identify and map critical fish habitat and degraded habitat.
- conducting intensive littoral zone mapping to identify critical fish habitat and degraded habitat.
- continuing to monitor the spring and fall salmonid runs including the operation of the electronic counter and periodic biological sampling.
- conducting creel surveys on coldwater streams.
- supporting long term index netting, tagging radio telemetry and/or creel survey programs of the Lake Ontario Fisheries Unit to determine and monitor fishing effort, harvest and the status of fish populations.
- continuing stocking assessment programs in conjunction with the Lake Ontario Fisheries Unit (lake trout, brown trout, Pacific salmon, and Atlantic salmon, and Fisheries Research (Atlantic salmon) to evaluate survival and growth of stocked fish.
- conducting fall spawning bed assessment projects to determine status of fall spawning salmonid populations.
- conducting stream habitat assessment projects to identify and map critical fish habitat and degraded habitat.
- reviewing data concerning fisheries problems and solutions from other districts, assessment units and outside agencies.
- promoting research/assessment studies related to fisheries problems in the district by fisheries research or other agencies (e.g. universities through the Ontario Renewable Resources Research Grant Program)
- investigating experimental management projects.
- promoting the collection of data by user groups through volunteer creel survey programs, etc.
- identifying and mapping areas where water level fluctuation problems cannot be resolved by water level control alone.
- conducting netting studies to determine abundance of northern pike.

3. Upgrade knowledge of Ontario Ministry of Natural Resources fisheries staff by:

- encouraging staff to regularly attend professional and technical courses, conferences and seminars.
- encouraging staff to regularly review current literature and reports.
- encouraging staff to contact colleages in other agencies to discuss fisheries management.

4. Evaluate the impacts of fishing derbies and tournaments by:

- collecting data from major derbies and tournaments. (e.g. Probass and Canadian Walleye Tournament)
- initiating and/or promoting studies with other agencies (e.g. tournament organizers, Ontario Federation of Anglers and Hunters, Sir Sandford Fleming College and Universities).
- reviewing literature and studies from other jurisdictions.

3.2.1.6.8 Lack of Public Awareness

1. Assess education needs by:

- identifying where additional education is required
- meeting with the public, interest groups and other agencies to discuss education needs.

2. Promote public education by:

- instituting regular meetings with user groups to upgrade their knowledge of fisheries management and to resolve conflicts.
- developing and upgrading fisheries information for the public and education packages for schools to emphasize the importance of protecting fisheries habitat and fish resources.
- attending sportsmen's shows to contact the public.
- using visitors services programs in Provincial parks and fish culture stations to educate the public.
- contacting landowners, real estate agents and representatives, contractors and developers to advise about the legalities and implications on fisheries of working in or near the water.
- co-operating with Ontario Ministry Of Environment in publishing and distributing the annual Guide to Eating Ontario Sport Fish.
- informing the public regarding the impacts of introducing non-native (exotic) fish species on native or naturalized fish species through newsreleases, articles, etc.
- promoting proper catch and release techniques.

3. Encourage public involvement in fisheries management by:

- promoting the Community Fisheries Involvement Program projects, self help programs, and volunteer creel survey programs.
- soliciting public input and review of major fisheries management initiatives.
- promoting co-operative projects with interest groups and resource users.
- encourage the public to report poachers and potential fisheries habitat destruction activities.

4. Encourage non-consumptive use of the fisheries resources by:

- promoting fish viewing locations throughout the district.
- developing educational displays at important viewing areas to explain fisheries management programs and fisheries biology.

3.2.2. COMMERCIAL FOOD FISHERY

3.2.2.1 Commercial Food Fishery Objective

To maintain a viable industry.

3.2.2.2 Commercial Food Fishery Target

To provide 71,580 kg (157,834lb.) annually by the year 2000.

3.2.2.3 Commercial Food Fishery Strategies and Tactics

3.2.2.3.1. Coarse Fish Not Harvested to Potential

1. Assess coarse fish populations by:

- determining the amount of coarse fish by species available for harvest.
- reviewing information from other districts, assessment units and outside agencies to determine potential yield of coarse fish.

2. Increase harvest of coarse fish by:
- allowing commercial fisheries to expand to other lakes where contaminants are not a problem.
- promoting existing commercial fisheries to take more coarse fish through extended seasons.
- promoting the use of selective gear to take more coarse fish (e.g. electrofishing boat to take carp).
- issuing new commercial licences to harvest coarse fish.

3.2.3 COMMERCIAL AQUACULTURE INDUSTRY

3.2.3.1 Commercial Aquaculture Industry Objectives and Targets

There are no objectives or targets identified for this industry by Ontario Ministry of Natural of Resources. However, there are a number of issues and problems concerning this industry which are addressed in the following section.

3.2.3.2. Commercial Aquaculture Industry Strategies and Targets.

3.2.3.2.1 Impacts of Aquaculture on Fisheries Resources

1. Develop guidelines to regulate the acquisition of wild broodstock by:

   - identifying lakes suitable for wild broodstock acquisition.
   - regulating when and how fish are taken.
   - establishing catch limits and size limits to regulate the number of fish taken by each fish farmer.

2. Protecting water quality by:

   - maintaining or increasing as required enforcement of legislation.
   - assisting other agencies (Ontario Ministry Of Environment) in the enforcement of their legislation to prevent reductions in water quality.
   - assisting fish farmers in developing effective effluent control programs to reduce impacts on downstream water quality, in co-operation with Ontario Ministry Of Environment.

3. Determine where the introduction of non-native species or stocks is likely to cause problems:

   - mapping the location of existing aquaculture operations to determine potential problem areas.
   - monitor fish populations downstream of existing aquaculture operations.
   - identifying non-native species or stocks of concern or interest.
   - reviewing information from other districts and other agencies.

4. Protect fisheries from the introduction of non-native species or stocks by:

   - maintaining and increasing as required enforcement of existing regulations regarding introductions.
   - regulating private aquaculture operations to ensure new species or stocks are not released.
   - educating aquaculture operators regarding the impacts of introduced species through newsreleases, articles, etc.

5. Promote the aquaculture industry to assist with fisheries management by:

- encouraging baitfish culture to relieve pressure or natural baitfish populations.
- purchasing catchable-size fish for put-and-take stocking.
- encouraging private fish farmers to provide fishing opportunities by constructing fish out ponds where the public pay a fee.

3.2.4 COMMERCIAL BAITFISH FISHERY

3.2.4.1 Commercial Baitfish Fishery Objective

To maintain a viable baitfish industry.

3.2.4.2 Commercial Baitfish Fishery Target

To produce 75,000 dozen annually.

3.2.4.3 Commercial Baitfish Fishery Strategies and Tactics

3.2.4.3.1 Level of Exploitation

1. Assess effectiveness of present baitfish management program by:

- identifying how the present allocation program is restricting harvest.
- determining allowable harvest levels for different baitfish species.
- identifying where baitfish are overharvested and underharvested.
- determining impacts of present harvest levels on baitfish populations.
- identifying when shortages of baitfish occur.

2. Protect baitfish populations by:

- limiting entry and restricting harvest.
- maintaining and increasing as required enforcement of existing regulations concerning harvest and sale of baitfish.
- ensuring harvesters and dealers have proper facilities to reduce losses prior to sale to the public.

3. Increase baitfish harvest and availability where appropriate by:

- revising block allocation system to allow for additional harvest in underharvested areas.
- increasing areas open to harvest by facilitating agreements between private landowners and bait harvesters licenced for that area.

- authorizing landowners to sell baitfish taken from enclosed dugout ponds on their property (A special permit under Section 60(2) of the Fisheries Act until legislation is amended).
- encouraging aquaculture operators to culture baitfish (e.g. white suckers and fathead minnows).
- maintaining waiting lists of individuals requesting baitfish harvester areas and review and update annually.
- reallocate harvest area licences that are inactive or used at a low level for 2 years to individuals on the waiting list.
- determining if areas presently closed to baitfish harvesters could be opened.

3.2.5 PROVINCIALLY RARE AND ENDANGERED FISH SPECIES

3.2.5.1 Provincially Rare and Endangered Fish Species Objectives

To prevent the extinction of any native fish species.

3.2.5.2 Provincially Rare and Endangered Fish Species Target

To ensure no native fish species become extinct.

3.2.5.3 Provincially Rare and Endangered Fish Species Strategies and Tactics

3.2.5.3.1 The Extinction of Provincially Rare and Endangered Fish Species

1. Assess the status of populations of provincially rare and endangered fish species by:

   - conducting surveys to identify the locations and abundance.
   - supporting the efforts of other organizations such as the Committee on the Status of Endangered Wildlife in Canada and the Royal Ontario Museum that are investigating the status of rare and endangered fish species.
   - monitoring baitfish harvest.

2. Protect rare and endangered fish species by:

   - maintaining existing enforcement legislation and using the plan input and review process with municipalities to maintain and protect critical habitat.
   - supporting efforts by other groups to protect critical habitat.
   - preventing baitfish harvest, if required, in areas where rare and endangered fish species exist.
   - inform the public on the status and importance of rare and endangered species in local waters.

4.0 IMPLEMENTATION

4.1 General

The fisheries management plan provides the direction for fisheries management in the Lindsay District to the year 2000. The strategies and tactics have been developed to address the major issues and problems and ensure that the fisheries objectives and targets are met. The strategies and tactics will be implemented through the following:

- a five year implementation schedule (Section 4.2) which will identify where and when specific tactics will be used;
- the annual work planning process where specific projects and programs will be developed and funded based on priorities identified in the fisheries management plan;
- participation in the planning and implementation of projects and activities of other divisions within MNR, other Ministries or government agencies and municipalities;
- co-operative management projects with private interest groups and individuals;
- the review of work plans and development proposals from other government agencies, and the private sector.

The District Manager is responsible for the preparation of the Lindsay District Fisheries Management Plan and the Regional Director of the Central Region is responsible for its approval. The plan and implementation schedule will be updated internally on an annual basis or as priorities change within the District. However, the implementation schedule will be formally revised only every five years with the approval of the Regional Director and subject to the same approval process and public review as the original plan. The next formal review will begin in 1993. Also any significant modifications required before the five year review will also be subject to public review. Approved changes will be reflected by changes to the Lindsay District Land Use Guidelines and other affected resource management plans. Also, the Lindsay District Fisheries Management Plan may be revised to reflect major revisions in the other resource management plan.

Many of the present management projects are subject to the Environmental Assessment Act administered by the Ministry of the Environment. This process ensures that the proposed activities are carefully reviewed by all agencies and the public prior to initiation, and the environment is protected.

A similar process is in place for work done by federal agencies on federal crown land. For example, any dam reconstruction, low-head power development on federal dams, and dredging and filling on federal crown land are subject to the Environmental Assessment and Review Process (EARP).

4.2 Implementation Schedule 1989 - 1993

The implementation schedule identifies the tactics which will be implemented during the first five years of the plan (1989 - 1993) to resolve the key fisheries issues and problems in the Lindsay District. The schedule also identifies where (if applicable) tactics will be implemented with present funding and where some tactics could be implemented if additional funding was available.

The implementation schedule will be used to develop annual fisheries work plans which are lists of priority rated projects the district wishes to complete and the amount of money required for each project. The work plans which are formulated one year in advance are sent to the Central Region office for approval. The number of projects funded depends on the amount of money allocated to the district from the region.

In the first few years of the implementation schedule, the management priorities will include habitat rehabilitation at walleye fastwater and shoal spawning sites, habitat protection for all fish species, long-term fisheries assessment by the Kawartha Lakes Fisheries Assessment Unit, rearrangement of stocking sites and species stocked in Lake Ontario, improvements to the muskellunge culture program at Deer Lake Fish Culture Station, maintenance of the Harwood Fish Culture Station, maintenance of the increased enforcement effort which resulted from resident angling licence funding, formulation of an access plan to priority rate efforts to improve access, and coldwater stream habitat assessment.

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Level of Exploitation

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 1 Use harvest controls to ensure efficient use of the fisheries resources and protect natural reproducing fish populations by:		
TACTICS		
- retaining present harvest controls (season length, catch and possession limits, size limits, and sanctuaries) to maintain present fishing quality.	District wide	
- imposing additional harvest controls only if required to maintain fishing quality (after public consultation).	Warmwater fishery	
- increasing the number and/or length of Lake Ontario tributary streams open to all year fishing for rainbow trout and brown trout.	All streams in the Regional Municipality of Durham and Northumberland County from CNR tracks to Lake Ontario except for Shelter Valley Creek.	
- investigating the feasibility of closing Lake Ontario tributary streams upstream of Highway 2 to fall fishing for Pacific salmon.	All streams in Regional Municipality of Durham and and Northumberland County upstream of the Highway 2 from Sept. 16 until Nov. 15 inclusive.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Level of Exploitation STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
- introducing a slot size limit where lake trout between 63 and 76 cm must be released.	Lake Ontario	
STRATEGY 2 Control illegal harvest to protect existing fisheries by:		
TACTICS		
- developing an enforcement plan to assist with priority rating enforcement requirements and directing effort to areas of most need.	District wide.	
- continuing to solicit assistance from other enforcement agencies (e.g. Ontario Provincial Police, local police departments, etc.).	District wide.	
- maintaining enforcement effort or increasing as required through additional conservation officers and/or deputy conservation officers.	District wide.	Any increase in effort.
- investigating the feasibility of changing the opening time and date of trout season to reduce enforcement problems and increase the number of legitimate fishing opportunities (e.g. a midweek noon opening).	District wide.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Level of Exploitation

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING

STRATEGY 3

Use stocking to rehabilitate and/or supplement native and/or naturalized fish species by:

TACTICS

- maintaining annual stocking levels of muskellunge fry and fingerlings pending results of stocking assessment.

	Fry	Fingerlings
Balsam Lake	--	2,000
Belmont Lake	20,000	500*
Buckhorn Lake	---	1,500
Cameron Lake	40,000	500*
Canal Lake	40,000	500*
Chemung Lake	---	1,000
Clear Lake	40,000	500*
Cordova Lake	20,000	250*
Dummer Lake	20,000	---
Katchiwanooka	20,000	250*
Lovesick Lake	20,000	250*
Lower Buckhorn	40,000	750
Mitchell Lake	20,000	---
Omemee Pond	20,000	---
Pigeon Lake	---	2,500
Rice Lake	120,000	4,000
Round Lake	20,000	250*
Sandy Lake	20,000	
Lake Scugog	---	2,500
Stony Lake	200,000	2,000
Sturgeon Lake	80,000	2,250
Indian River	20,000	---
Otonabee River	40,000	---
	800,000	20,000

If additional funding was available we would first try to increase the average size of fingerlings from 76mm to 150mm. Then we would try to increase the number of fingerlings produced.

*Fingerlings stocked in alternate years.

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Level of Exploitation STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 3 - TACTICS (Cont'd)		
- maintaining annual stocking levels of lake trout in Lindsay District waters of Lake Ontario as required for rehabilitation on a lake-wide basis.	200,000 yearlings (Port Hope and Cobourg area)	
- increasing annual stocking levels of brown trout in Lindsay District waters of Lake Ontario to at least 50,000 yearlings, depending on production capability.	15,000 (Port Hope) 10,000 (Cobourg) 25,000 (Oshawa)	
- reviewing and approving Community Fisheries Involvement Program culture applications on case by case basis and allow only projects which are consistent with sound fisheries management.	District wide.	
- continuing to support the experimental management program to establish naturally reproducing Atlantic salmon populations in Lake Ontario tributary streams. stocking program.	Wilmot Creek	Ganaraska River and other coldwater streams depending on results of feasibility study.
- maintaining present adult fish transfer over obstructions to enhance fish populations.	Cobourg Creek Oshawa Creek Lucas Point Creek	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Level of Exploitation

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 4 Use stocking to provide additional angling opportunities by:		
TACTICS		
- increasing annual stocking levels of chinook salmon in the Lindsay District waters of Lake Ontario to at least 100,000 fingerlings, depending on production capability.	Oshawa Creek (30,000) Bowmanville Creek (30,000) Cobourg Creek (40,000)	
- encouraging private fish farmers to construct fish out ponds where the public pay a fee.	District wide.	
- continuing to purchase rainbow trout from private fish farmers to annually stock Provincial Fishing Area ponds.	2,500 yearlings (Millbrook Provincial Fishing Area)	1000 additional yearlings.
- reviewing Community Fisheries Involvement Program culture application on a case by case basis and allow only projects which are consistent with sound fisheries management.	District wide.	
STRATEGY 5 Improve public access to inland and Lake Ontario fisheries by:		
TACTICS		
- developing an access plan to priority rate access needs.	District wide.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Level of Exploitation STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
- improving existing access sites on crown land by upgrading facilities.		Locations depend on recommendations of access plan.
- working with individuals, interest groups, other agencies and/or municipalities to upgrade existing access sites and/or build new sites through financial incentives and cost sharing programs.	District wide.	
- acquiring and developing new access points.		Locations depend on recommendations of access plan.
- supporting acquisition programs by individuals, interest groups, other agencies and/or municipalities where access to the fisheries will be provided.	District wide.	
- supporting non-profit fish derby or tournament organizations which provide funding to develop new access facilities.	District wide.	
- negotiating easements or agreements with private landowners to provide access to anglers.		Locations depend on recommendations of access plan.
- working with angler organizations and private landowners to encourage fishing access on private land.	Coldwater streams.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Level of Exploitation

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
- establishing a committee with anglers and landowners to discuss access problems, to identify landowners concerns, and to develop options which could be used to encourage landowner to provide access to anglers.	Ganaraska River	
- promoting the location and facilities available at existing access points.	District wide.	
STRATEGY 6		
Direct fishing effort to underharvested fish species by:		
TACTICS		
- promoting the use of alternate species (e.g. carp, suckers and bullheads) through special education programs.	District wide.	Development of new programs.
- establishing bowfishing seasons for carp	Division 6 and Division 2 as shown in Fishing Regulations.	
- encouraging derbies directed at coarse fish such as carp bullheads and suckers.	District wide.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Nutrient Inputs (Eutrophication) and Physical Alteration of Fish Habitat

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 1 Protect water quality and fish habitat by:		
TACTICS - maintaining and increasing as required enforcement of existing legislation to maintain and/or improve water quality and fish habitat.	District wide.	Any increase in effort.
- assisting other agencies in the enforcement of their legislation to maintain and/or improve water quality and fish habitat.	District wide.	
- implementing the federal Department of Fisheries and Oceans policy for the management of fish habitat, including the principle of net gain/no net loss of fish habitat, i.e., attempt to balance unavoidable loss of habitat with replacement and improvement of habitat on a project-by-project basis.	District wide.	
- working with conservation authorities, other provincial agencies (e.g. Ontario Ministry of the Environment, Ontario Ministry of Agriculture and Food,) other federal agencies (e.g. Department of Fisheries and Oceans, and Environment Canada), the Great Lakes Fisheries Commission and International Joint Commission to ensure that critical fish habitat is identified and receives recognition and protection.	District wide.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Nutrient Inputs (Eutrophication) and Physical Alteration of Fish Habitat

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 1 (Cont'd)		
- working with municipalities to ensure that official plans, official plan amendments, and zoning bylaws afford protection to fisheries and to encourage municipalities to accept the responsibility of the maintenance of stormwater control structures and streambank stabilization projects.	District wide.	
- working with landowners, developers and real estate representatives to increase awareness of the impacts of land use activities on fisheries resources and the economic and recreational benefits of healthy fisheries.	District wide.	
- regulating the timing of water related development activities according to the species present and the importance of the area.	District wide.	
- minimizing disturbances from land use practices along watercourses (e.g. agricultural and development activities) by retaining or establishing vegetated buffer zones in accordance with the Central Region Guidelines (OMNR, 1987e).	District wide.	
- requiring erosion and sedimentation controls during and after construction on all development activities to reduce siltation of watercourses.	District wide.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Nutrient Inputs (Eutrophication) and Physical Alteration of Fish Habitat

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 1 (Cont'd)		
- prohibiting the direct inflow of untreated stormwater into watercourses and ensure that stormwater treatment and control reflects current technology, i.e. source control of stormwater, retention/detention facilities, landscape design, and that control ponds be designed to detain at least 125 m^3/ha runoff from development sites for at least 12 hours, and/0r be capable of removing particles down to 40 microns in size.	District wide.	
- strongly discourage the dredging and channelization of watercourses and where channelization is unavoidable, ensure mitigative measures are implemented (e.g. 2:1 slopes, sedimentation control and provisions for fish passage).	District wide.	
- prohibiting the construction of instream ponds which will affect critical fish habitat (e.g. headwater areas and spawning areas).	District wide.	
- acquiring land through purchase, or supporting the acquisition of land by other agencies (e.g. Conservation Authorities.	District wide.	
- implementing existing guidelines for wetlands management and wetlands policy to protect wetlands which are important to the fisheries resources.	District wide.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Nutrient Inputs (Eutrophication) and Physical Alteration of Fish Habitat

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 2 Rehabilitate degraded water quality and fish habitat by:		
TACTICS - assessing rehabilitation needs and setting priorities.	District wide.	
- initiating rehabilitation projects on critical habitat (e.g. spawning and nursery habitat).	Warmwater lakes and rivers (sites to be determined).	Increased level of activity as sites are identified.
- initiating rubble placement projects at fast water and shoal spawning sites.	Warmwater lakes and rivers (sites to be determined).	Increased level of activity as sites are identified.
- encouraging and assisting other agencies (e.g. Trent-Severn Waterway, Conservation Authorities) and municipalities with rehabilitation projects.	District wide.	
- encouraging and assisting through Community Fisheries Involvement Program, landowners, private interest groups and angler groups with rehabilitation projects.	District wide	
- encouraging landowners to removal instream dams to reduce downstream water temperatures.	Coldwater streams.	
- supporting the conversion of dams by landowners from surface draw to bottom draw on coldwater streams to reduce downstream water temperatures.	Coldwater streams. (advice and information)	Coldwater streams (if funding required).

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Nutrient Inputs (Eutrophication) and Physical Alteration of Fish Habitat

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
- working with the International Joint Commission to develop a Remedial Action Plan (RAP) for Areas of Concern.	Port Hope Harbour	
STRATEGY 3 Create new fish habitat by:		
TACTICS		
- assessing where habitat is limiting and setting priorities.	District wide.	
- initiating projects where habitat is limiting (e.g. new spawning channels, artificial reefs, etc.).		As sites are identified.
- promoting fish habitat creation projects by other agencies (e.g. Conservation Authorities).	District wide.	
- promoting fish habitat creation projects by interest groups or landowners through Community Fisheries involvement program.	District wide.	
STRATEGY 4 Assist all major users of water to minimize fish mortalities due to inpingement on intake screens destruction in pumps at all intakes by:		
TACTICS		
- initiating and/or refining programs to accurately monitor numbers, weights, condition, age, etc., of impinged fish.	Lindsay District waters of Lake Ontario.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Nutrient Inputs (Eutrophication) and Physical Alteration of Fish Habitat

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
- continuing to promote experimentation with intake designs to minimize fish impingement and construction of new intakes to state-of-the-art standards.	Lindsay District waters of Lake Ontario.	
- recommending upgrading existing facilities as new designs and information become available.	Lindsay District waters of Lake Ontario.	
- continuing to promote the elimination of use of tempering water or where not acceptable continuing to promote experimentation with pump design to minimize damage to fish.	Lindsay District waters of Lake Ontario.	
- investigating the need for users to replace or pay for replacement of significant fish losses due to entrainment, and impingement.	Lindsay District waters of Lake Ontario.	
- obtaining information on water volumes taken, design and location of water intakes for all users in Lake Ontario and assessing their local and combined impacts on the aquatic community.	Lindsay District waters of Lake Ontario.	
STRATEGY 5 Assist all major users of water to minimize larval fish and egg mortality due to entrainment at all major water intakes by:		
TACTICS:		
- recommending that users minimize cooling water requirements and revise Ministry of the Environment requirements accordingly.	Lindsay District waters of Lake Ontario.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
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ISSUE OR PROBLEM - Sport Fishery - Nutrient Inputs (Eutrophication) and Physical Alteration of Fish Habitat

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
- requiring users to locate intake structures beyond the nearshore zone away from existing and potential spawning and nursery areas.	Lindsay District waters of Lake Ontario.	
- initiating programs to assess the entrainment mortality of larval fish and fish eggs to determine impact on the fish community.	Lindsay District waters of Lake Ontario.	
- promoting studies by users to determine optimum cooling water flows and temperature change combinations to minimize entrainment and thermal discharge stresses at each plant based on previous recommendations.	Lindsay District waters of Lake Ontario.	
STRATEGY 6		
Assist all major users of cooling water to assess and minimize negative fisheries impacts associated with thermal discharge from all sources by:		
TACTICS		
- requiring users to delineate the year round zones of influence of thermal plumes.	Lindsay District waters of Lake Ontario.	
- encouraging users to use thermal plume models for predicting potential environmental impacts at future generating station sites.	Lindsay District waters of Lake Ontario.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Nutrient Inputs (Eutrophication) and Physical Alteration of Fish Habitat

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
- encouraging users to conduct studies of the northshore littoral community to determine fisheries impacts in zones of thermal influence evaluating impacts of proposed increases in thermal discharges.	Lindsay District waters of Lake Ontario.	
- discouraging the exemptions from the Environmental Assessment Act of any facilities with major thermal discharges.	Lindsay District waters of Lake Ontario.	
- promoting long-term studies in the areas affected by thermal discharges so that subtle environmental modifications are detected.	Lindsay District waters of Lake Ontario.	
- promoting preoperational assessments to address the cumulative effects of future generating facilities and the combined affects with other human water users on the nearshore ecology as well as the additive effects of each individual plant.	Lindsay District waters of Lake Ontario.	
- promoting experiments to determine potential effects of discharge temperatures and currents on migratory patterns of fish.	Lindsay District waters of Lake Ontario.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Nutrient Inputs (Eutrophication) and Physical Alteration of Fish Habitat

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
- requiring future thermal discharge outfalls to be placed offshore beyond the littoral zone (approximately below 10m) and to incorporate the offshore diffuser used at the Darlington Nuclear Generating Station.	Lindsay District waters of Lake Ontario.	
- preventing further interruptions of alongshore movements of water, sediment, and fish due discharge currents or intake/discharge structures.	Lindsay District waters of Lake Ontario.	
- conducting creels to determine angler catch and effort at facilities within the zone of influence of thermal plumes.	Lindsay District waters of Lake Ontario.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
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ISSUE OR PROBLEM - Sport Fishery - Water Level Fluctuations STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 1 Protect fisheries from water level fluctuations by:		
TACTICS - monitoring water levels on lakes and rivers to identify specific problems and determining magnitude.	District wide.	
- working with other agencies involved in water level control (e.g. Trent-Severn Waterway and Conservation Authorities) and water use (e.g. Ontario Hydro) to reduce or eliminate impacts on fish production and reproduction.	District wide.	
- developing and implementing comprehensive water level control guidelines so other agencies are aware of critical areas and required water levels.	District wide.	
- ensuring applications for microhydro generating systems, small hydro developments, and other hydro developments are carefully reviewed to ensure minimal impacts on fisheries.	District wide.	
- maintaining and increasing as required enforcement effort to control problems, e.g. illegal dams.	District wide.	Any increase in effort.
- ensuring dam owners are aware of the potential impacts of dam operations.	District wide.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Water Level Fluctuations

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 2 Rehabilitate fisheries which are affected by water level fluctuations by:		
TACTICS		
- reconstructing and/or replacing habitat to reduce impacts.		Lock 19 (east side) and any other sites if identified.
- promoting rehabilitation projects by other agencies and municipalities.	District wide.	
- promoting and assisting rehabilitation projects by private interest groups, angler groups, and landowners through Community Fisheries Involvement Program.	District wide.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Introduction of Non-Native (Exotic) Fish Species and Stocks.

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 1 Protect existing fisheries from introduced fish species and stocks by:		
TACTICS		
- maintaining and increasing as required enforcement of existing regulations against the moving of fish from waterbody to waterbody.	District wide.	Any increase in effort.
- restricting access by using existing barriers or constructing new barriers (e.g. lake-run salmonids into resident brown trout and brook trout waters, and northern pike into warmwater lakes).	District wide.	Construction of new barriers.
- regulating private aquaculture industry to ensure captive stocks are not released into public waters.	District wide.	
- identifying non-native species of concern or interest.	District wide.	
- conducting netting studies to determine abundance of northern pike.	Canal Lake	Other warmwater lakes or rivers as required.

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
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ISSUE OR PROBLEM - Sport Fishery - Introduction of Non-Native (Exotic) Fish Species and Stocks.

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 2 Reduce impacts of introduced undesirable species or stocks by:		
TACTICS		
- encouraging selective harvest to reduce numbers.	District wide	
- developing specific programs to control/eradicate introduced (exotic) fish (e.g. northern pike).		Warmwater lakes and rivers as required.
- supporting the use of lampricides and the construction of low-head barrier dams by Sea Lamprey Control to control the production of sea lamprey.	Lake Ontario tributary streams.	
STRATEGY 3 Investigate the feasibility of introducing new species or strains to provide additional recreational opportunities:		
- review the literature on results of introduction programs in other areas.		
- monitoring the success of introductions in other areas (e.g. Skamania rainbow trout in Lake Huron).	Lake Ontario	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Contaminants and Acid Precipitation

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 1		
Protect fisheries from contaminants and acid precipitation by:		
TACTICS		
- maintaining and increasing as required enforcement of existing regulations to prevent contamination.	District wide.	Any increase in effort.
- assisting Ontario Ministry of Environment and other agencies in the enforcement of their legislation to prevent contamination.	District wide.	
- assisting Ontario Ministry of Environment and other agencies in detecting and controlling sources of contamination.	District wide.	
- supporting research programs by Fisheries Research and other agencies to study impacts of contaminants and acid precipitation.	District wide.	
- continuing to assist Ontario Ministry of Environment with the collection of fish samples for contaminant analysis.	Ganaraska River Balsam Lake Buckhorn Lake Rice Lake Lake Scugog	Other lakes and rivers as required.

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
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ISSUE OR PROBLEM - Sport Fishery - Conflicts Between Users (Resource Allocation)

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 1		
Deal with conflicts between users and allocation of the fish resources by:		
TACTICS		
- assessing needs of users to determine if conflicts are real or perceived.	District wide.	
- reviewing information from other districts and outside agencies regarding other conflicts and their resolution.	As required.	
- basing the allocation on allowable yield, approved fisheries management plans, sound fisheries management and user demand.	District wide.	
- encouraging users to meet with each other to resolve the conflicts.	District wide.	
- continuing to support the negotiations to resolve the question of fishing rights.	As required.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
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ISSUE OR PROBLEM - Sport Fishery - Inadequate Scientific Knowledge and Lack of an Adequate Data Base

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 1 Assess information requirements by:		
TACTICS - reviewing background information to identify where more information and research are required.	Ongoing.	
- priority rating information and research needs at the field level.	Ongoing.	
- determining if district, assessment units, or research should conduct studies.	As required.	
- reviewing information from other districts, units and outside agencies.	Ongoing	
STRATEGY 2 Maintain and/or enhance the fisheries assessment program by:		
TACTICS - updating the basic inventory data as required (have been completed on all major waterbodies).		District wide as required.

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTATION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Sport Fishery - Inadequate Scientific Knowledge and Lack of an Adequate Data Base

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 2 (Cont'd)		
- conducting long-term studies through the Kawartha Lake Fisheries Assessment Unit including index netting,tagging, creel surveys and/or radio telemetry to determine and monitor fishing effort, harvest and the status of fish populations on type lakes.	Spring Spawning Assessment (Annually) Balsam Lake (Coboconk) Pigeon Lake (Bobcaygeon) Lake Scugog (Muskellunge) Index Netting (Alternate Years) Balsam Lake Buckhorn Lake Rice Lake Lake Scugog Walleye Larval Assessment (Annually) Balsam Lake Otonabee River (Lock 19) Rice Lake Creel Surveys (Every Four Years) Balsam Lake Pigeon-Buckhorn-Chemung Lake Rice Lake Lake Scugog	Index Netting (Annually) Balsam Lake Buckhorn Lake Chemung Lake Pigeon Lake Rice Lake Lake Scugog

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ISSUE OR PROBLEM - Sport Fishery - Inadequate Scientific Knowledge and Lack of an Adequate Data Base

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 2 (Cont'd) TACTICS (Cont'd)		
- conducting index netting, tagging and/or radio telemetry studies to determine and monitor fishing effort, harvest and the status of fish populations on lakes other than Kawartha Lakes Fisheries Assessment Unit type lakes.	Stony Lake	Other lakes as required.
- conducting index creel surveys on warmwater lakes other than Kawartha Lakes Fisheries Assessment Unit type lakes.	Belmont Lake Cameron Lake Canal Lake Clear Lake Cordova Lake Katchewanooka Lake Lovesick lake Lower Buckhorn Lake Round Lake Sandy Lake Stony Lake Sturgeon lake	Other lakes as required.
- continuing stocking assessment programs for muskellunge.	Lake Scugog Stony Lake	Balsam Lake Buckhorn Lake Chemung Lake Pigeon Lake
- conducting walleye shoreline and shoal spawning and map critical fish habitat and degraded habitat.	Balsam Lake Buckhorn Lake Chemong Lake Pigeon Lake Rice Lake Scugog Lake	Remaining warmwater lakes.

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
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ISSUE OR PROBLEM - Sport Fishery - Inadequate Scientific Knowledge and Lack of an Adequate Data Base

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 2 (Cont'd) TACTICS (Cont'd)		
- conducting intensive littoral zone mapping to identify critical fish habitat and degraded habitat.		Lake Scugog Rice Lake
- continuing to monitor the spring and fall salmonid runs including the operation of the electronic counter and periodic biological sampling.	Ganaraska River (Ganaraska Fishway)	
- conducting creel surveys on coldwater streams.		Bowmanville Creek Cobourg Creek Ganaraska River Shelter Valley Creek Soper Creek Wilmot Creek
- supporting long term index netting, tagging radio telemetry and/or creel survey programs of the Lake Ontario Fisheries Unit to determine and monitor fishing effort, harvest, and the status of fish populations.	Lake Ontario and tributary streams.	
- continuing stocking assessment programs in conjunction with the Lake Ontario Fisheries Unit (lake trout, brown trout, Pacific salmon, and Atlantic salmon), and Fisheries Research (Atlantic salmon) to evaluate survival and growth of stocked fish.	Lake Ontario and tributary streams.	
- conducting fall spawning bed assessment projects to determine status of fall spawning salmonid populations.	Ganaraska River Bowmanville Creek Soper Creek Cobourg Creek	Remaining coldwater streams

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
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ISSUE OR PROBLEM - Sport Fishery - Inadequate Scientific Knowledge and Lack of an Adequate Data Base

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 2 (Cont'd)		
TACTICS (Cont'd)		
- conducting stream habitat assessment projects to identify and map critical fish habitat and degraded habitat.	Bowmanville Creek Ganaraska River Wilmot Creek	Barnumhouse Creek Cobourg Creek Farewell Creek Shelter Valley Creek Soper Creek
- reviewing data concerning fisheries problems and solutions from other districts, assessment units and outside agencies.	Ongoing	
- promoting research/assessment studies related to fisheries problems in the district by fisheries research or other agencies (e.g. universities through the Ontario Renewable Resources Research Grant Program)	Ongoing	
- investigating experimental management projects.	Ongoing	
- promoting the collection of data by user groups through volunteer creel survey programs, etc.	District wide.	
- identifying and mapping areas where water level fluctuation problems cannot be resolved by water level control alone.	District wide (as information becomes available).	
- conducting netting studies to determine abundance of northern pike.	Canal Lake	Remaining warmwater lakes if pike are found.

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
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ISSUE OR PROBLEM - Sport Fishery - Inadequate Scientific Knowledge and Lack of an Adequate Data Base

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 3 Upgrade knowledge of Ontario Ministry of Natural Resources fisheries staff by:		
TACTICS - encouraging staff to regularly attend professional and technical courses, conferences and seminars.	Ongoing	More staff could attend conferences and seminars especially out-of-province.
- encouraging staff to regularly review current literature and reports.	Ongoing	
- encouraging staff to contact colleges in other agencies to discuss fisheries management.	Ongoing	
STRATEGY 4 Evaluate the impacts of fishing derbies and tournaments by:		
TACTICS - collecting data from major derbies and tournaments (e.g. ProBass and Canada Walleye Tournaments).	District wide, as required.	
- initiating and/or promoting studies with other agencies (e.g. tournament organizers, Ontario Federation of Anglers and Hunters, Sir Sandford Fleming College and Universities).	District wide.	If financial support required.
- reviewing literature and studies from other jurisdictions.	Ongoing	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
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ISSUE OR PROBLEM - Sport Fishery - Lack of Public Awareness

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 1		
Assess education needs by:		
TACTICS		
- identifying where additional education is required.	District wide.	
- meeting with the public, interest groups and other agencies to discuss education needs.	District wide.	
STRATEGY 2		
Promote public education by:		
TACTICS		
- instituting regular meetings with user groups to upgrade their knowledge of fisheries management and to resolve conflicts.	District wide.	
- developing and upgrading fisheries information for the public and education packages for schools to emphasize the importance of protecting fisheries habitat and fish resources.	District wide	Development of new education packages.
- attending sportsmen's shows and fall fairs to contact the public.	District wide.	
- using visitors services programs in provincial parks and fish culture stations to educate the public.	Balsam lake P.P. Darlington P.P. Emily P.P. Serpent Mounds P.P. Deer Lake F.C.S. Harwood F.C.S.	Development of new programs.

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
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ISSUE OR PROBLEM - Sport Fishery - Lack of Public Awareness

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 2 (Cont'd)		
TACTICS (Cont'd)		
- contacting landowners, real estate agents and representatives, contractors and developers to advise about the legalities and implications on fisheries of working in or near the water.	District wide.	
- co-operating with Ontario Ministry Of Environment in publishing and distributing the annual Guide to Eating Ontario Sport Fish.	Ongoing	
- informing the public regarding the impacts of introducing non-native (exotic) fish species and stocks on native or naturalized fish species through newsreleases, articles, etc.	District wide.	
- promoting proper catch and release techniques.	District wide.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
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ISSUE OR PROBLEM - Sport Fishery - Lack of Public Awareness STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 3 Encourage public involvement in fisheries management by:		
TACTICS - promoting the Community Fisheries Involvement Program projects, self help programs, and volunteer creel survey programs.	District wide.	
- soliciting public input and review of major fisheries management initiatives.	District wide.	
- promoting co-operative projects with interest groups and resource users.	District wide.	
- encourage the public to report poachers and potential fisheries habitat destruction activities.	District wide.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
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ISSUE OR PROBLEM - Sport Fishery - Lack of Public Awareness STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 4		
Encourage non-consumptive use of the fisheries resources by:		
TACTICS - promoting fish viewing locations throughout the district.	Lake Ontario tributary streams and walleye fastwater spawning areas.	
- developing educational displays at important viewing areas to explain fisheries management programs and fisheries biology.		Ganaraska Fishway Other areas as required.

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
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ISSUE OR PROBLEM - Commercial Food Fishery - Coarse Fish Not Harvested to Potential

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 1		
Assess coarse fish populations by:		
TACTICS		
- determining the amount of coarse fish by species available for harvest.	Warmwater lakes.	
- reviewing information from other districts, assessment units and outside agencies to determine potential yield of coarse fish.	Ongoing	
STRATEGY 2		
Increase harvest of coarse fish by:		
TACTICS		
- allowing commercial fisheries to expand to other lakes where contaminants are not a problem.	Warmwater lakes (to be determined)	
- promoting existing commercial fisheries to take more coarse fish through extended seasons.	Rice Lake Sturgeon Lake	
- promoting the use of selective gear to take more coarse fish (e.g. electrofishing boat to take carp).	Rice Lake Sturgeon Lake Other warmwater lakes if expansion of fishery occurs.	
- issuing new commercial licences to harvest coarse fish.	Warmwater Lakes other than Rice Lake and Sturgeon Lake	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Commercial Aquaculture Industry - Impacts of Aquaculture on Fisheries Resources

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 1 Develop guidelines to regulate the acquisition of wild broodstock by:		
TACTICS - identifying lakes suitable for wild broodstock acquisition.	District wide.	
- regulating when and how fish are taken.	District wide.	
- establishing catch limits and size limits to regulate the number of fish taken by each fish farmer.	District wide.	
STRATEGY 2 Protecting water quality by:		
TACTICS - maintain or increase,as required, enforcement of legislation.	District wide.	Any increase in effort.
- assisting other agencies (Ontario Ministry of Environment) in the enforcement of their legislation to prevent reductions in water quality.	District wide.	
- assisting fish farmers in developing effective effluent control programs to reduce impacts on downstream water quality, in cooperation with Ontario Ministry of Environment.	District wide.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Commercial Aquaculture Industry - Impacts of Aquaculture on Fisheries Resources

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 3 Determine where the introduction of non-native species or stocks is likely to cause problems:		
TACTICS - mapping the location of existing aquaculture operations to determine potential problem areas.	District wide.	
- monitor fish populations downstream of existing aquaculture operations.		District wide.
- identifying non-native species or stocks of concern or interest.	Ongoing	
- reviewing information from other districts and agencies.	Ongoing	
STRATEGY 4 Protect fisheries from the introduction of non-native species or stocks by:		
TACTICS - maintaining and increasing as required enforcement of existing regulations regarding introductions.	District wide.	Any increase in effort.
- regulating private aquaculture operations to ensure new species or stocks are not released.	District wide	
- educating aquaculture operators regarding the impacts of introduced species through newsreleases, articles, etc.	District wide	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Commercial Aquaculture Industry - Impacts of Aquaculture on Fisheries Resources

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 5 Promote the acquaculture industry to assist with fisheries management by:		
TACTICS		
- encouraging baitfish culture to relieve pressure on natural baitfish populations.	District wide.	
- purchasing catchable-size fish for put-and-take stocking at Provincial Fishing Areas.	2,500 yearlings (Millbrook Provincial Fishing Area).	1,000 additional yearlings
- encouraging private fish farmers to construct fish-out ponds where the public pay to provide fishing opportunities.	District wide.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Commercial Baitfish Industry - Level of Exploitation

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 1		
Assess effectiveness of present baitfish management program by:		
TACTICS		
- identifying how the present allocation program is restricting harvest.		District wide.
- determining allowable harvest levels for different baitfish species.		District wide
- identifying where baitfish are overharvested and underharvested.		District wide.
- determining impacts of present harvest levels on populations.		District wide
- identifying when shortages of baitfish occur.	District wide	
STRATEGY 2		
Protect baitfish populations by:		
TACTICS		
- limiting entry and restricting harvest.	As required.	
- maintaining and increasing as required enforcement of existing regulations concerning harvest and sale of baitfish.	District wide	Any increase in effort.
- ensuring harvesters and dealers have proper facilities to reduce losses prior to sale to the public.	District wide	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Commercial Baitfish Industry - Level of Exploitation.

STRATEGIES AND TACTICS

	PRESENT FUNDING	ADDITIONAL FUNLING
STRATEGY 3 Increase baitfish harvest and availability where appropriate by:		
TACTICS - revising block allocation system to allow for additional harvest in underharvested areas.		District wide.
- increasing areas open to harvest by facilitating agreements between private landowners and bait harvesters licenced in that area.	To be determined.	
- authorizing landowners to sell baitfish taken from enclosed dugout ponds on their property (A special permit under Section 60(2) of the Fisheries Act would be used until legislation is amended).	District wide.	
- encouraging aquaculture operators to culture baitfish (e.g. white suckers and fathead minnows).	District wide.	
- maintaining waiting lists of individuals requesting baitfish harvester areas and review and update annually.	Ongoing	
- reallocate harvest area licences that are inactive or used at a low level for 2 years to individuals on the waiting list.	As required.	
- determining if areas presently closed to baitfish harvesters could be opened.	District wide.	

LINDSAY DISTRICT FISHERIES MANAGEMENT PLAN
IMPLEMENTION SCHEDULE 1989 - 1993

ISSUE OR PROBLEM - Provincially Rare and Endangered Fish Species -
- The Extinction of Provincially Rare and Endangered Fish Species

STRATEGIES AND TACTICS	PRESENT FUNDING	ADDITIONAL FUNDING
STRATEGY 1		
Assess the status of populations of provincially rare and endangered fish species by:		
TACTICS		
- conducting surveys to identify the locations and abundance.		District wide.
- supporting the efforts of other organizations such as the Committee On The Status of Endangered Wildlife In Canada and the Royal Ontario Museum that are investigating the status of rare and endangered fish species.	On going.	
- monitoring baitfish harvest.	District wide.	
STRATEGY 2		
Protect rare and endangered fish species by:		
TACTICS		
- maintaining enforcement of existing legislation and using the plan input and review process with municipalities to maintain and protect critical habitat.	District wide.	Any increase in effort.
- supporting efforts by other groups to protect critical habitat.	District wide.	
- preventing baitfish harvest, if required, in areas where rare and endangered fish species exist.	As required.	
- inform the public on the status and importance of rare and endangered species in local waters.	District wide.	

GLOSSARY

Angler-Day

A measure of fishing effort or activity which is equivalent to four angler-hours. This is based on the assumption that the average fishing trip is approximately four hours. One angler-day is considered to be one angler opportunity.

Angler-Hour

A measure of fishing effort or activity and represents one hour of active fishing by one angler.

Baitfish

Fish species which belong to the following groups:

- minnows (Family Cyprinidae) except carp and goldfish;
- suckers (Fmaily Catostomidae)
- ciscoes or herring (Family Coregonidae, Genes Leucichthys);
- darters (Family Percidae, subfamily Etheostomatinae);
- mudminnows (Family Umbridae);
- sculpins (Family Cottidae);
- sticklebacks (Family Gasterosteidae);
- trout-perches (Family Percopsidae);

In addition, yellow perch and alewife can be harvested and used as baitfish, but only by special provision of the licence and only in waters of the Great Lakes.

Coarse Fish

Fish species which belong to the following groups:

- gars (Family Lepisosteidae);
- bowfins or dogfishes (Amia calva);
- bullheads or catfishes (Family Ictaluridae);
- burbots or lings (Lota lota);
- carp (Cyprinus carpio);
- eels (Anguilla rostrata);
- freshwater drums or sheepsheads (Aplodinotus grunniens);
- smelt (Osmerus mordax);
- suckers (Family Catostomidae);

Coldwater Habitat

Waterbodies with some areas which have summer maximum water temperatures of less than 21 degrees celcius and are capable of supporting salmonids.

Critical Fish Habitat

Habitat considered to be essential for a fish species, e.g. spawning habitat, nursery habitat or migratory corridors.

Crown Land

All land (including land and water) held by the province, both land which has never been sold and land which has been reacquired.

Current Use

A measure of use of the fish resources by key users (e.g., anglers, commercial fishermen, bait harvesters, etc.) and presented as angler-days of fishing effort and kilograms of fish harvested for the sport fishery, kilograms of fish harvested for the commercial fishery, and dozens of baitfish harvested by the bait fishery.

Exotic Fish Species

A fish species which is neither native nor has become self-sustaining in Ontario waters.

Fish Community

A combination of different fish species living and interacting together in the same waterbody.

Impingement

To strike with a sharp collision against an object (e.g., intake screens).

Indigenous (Native) Fish Species

A fish species which originally inhabited the waterbody.

Morphoedaphic Index (MEI)

An index used to estimate the potential yield of a body of water.

Non-Resident

An angler whose principle residence is outside of Ontario.

Objective

A quantifiable and attainable end which is to be achieved.

Pacific Salmon

Any member of the genus Onchorhynchus including chinook salmon, coho salmon, kokanee salmon, and pink salmon.

Panfish

The following fish species: pumpkinseed, bluegill, rock bass, yellow perch and black crappie.

Potential Yield

An estimated weight of fish that can be removed from a water body on a sustained basis while maintaining fish populations.

Projected Use

The level of fishing effort (angler-days) and/or fish harvested (kg or dozen) that is expected to occur by the year 2000.

Public Land

Any land owned or administered by a public body or agency. It includes federal, provincial and municipality owned lands and lands held by agencies such as parks commissions and conservation authorities.

Resident

An angler whose principle residence is in Ontario.

Salmonids

Any member of the Family Salmonidae including trout, salmon, whitefish and grayling.

Sportfish

Any fish that are legally caught by angling.

Strategy

Planned actions or measures to achieve a desired end.

Tactic

A method devised to achieve one or more strategies.

Target

A quantified level of fisheries use or production to be achieved or completed by a specific date.

Underproducing Waters

Water from which fish population is less than potential because of stresses such as water quality, species composition, overharvest, or absence of desirable species.

Warmwater Habitat

Waterbodies which are usually too warm, too shallow, or too enriched to support coldwater species such as trout and salmon.

Wetlands

Lands which are permanently or seasonally covered with shallow water and where distinctive soil conditions, plant, and wildlife communities develop.

REFERENCES

D.F.O. 1986 Policy For the Management of Fish Habitat. 30 p

OMNR. 1983. Lindsay District Land Use Guidelines. 65 p

OMNR. 1986a. Lindsay District Fisheries Management Plan, Terms of Reference. 26 p.

OMNR. 1986b. District Fisheries Management Plans, planning manual. 91p.

OMNR. 1987a. Lindsay District Fisheries Background Report. p.

OMNR. 1987b. Lindsay District Fisheries Management Plan, Summary Report, Basckground Information and Optional Management Strategies and Tactics. 87p.

OMNR. 1987c. Analysis of Public Input, First Round July 1987.

OMNR. 1987d. Lindsay District Fisheries Management Plan. Draft. 90p.

OMNR 1987e. Guidelines on the Use of Vegetative Buffer Zones to Protect Fish Habitat in an Urban Environment. 36p.

OMNR 1988 Analysis of Public Input to Draft Plan, Second Round February 1988.

APPENDIX I

Waterbodies in the Lindsay District Listed by the Type of Fishery

Inland Warmwater Fishery

(a) Lakes with an area equal to or greater than 10.0 ha. and/or a mean depth equal to or greater than 1 m (T - Kawartha Lakes Fisheries Assessment Unit Type Lakes):

Balsam (T)
Belmont
Big Bald
Buckhorn (T)
Cameron
Canal
Chalk
Chemung (T)
Clear
Cordova
Cranberry
Dummer
Emily
Katchewanooka (Katchiwano)
Lanes
Little Bald
Little
Long
Lost (Belmont Twp.)
Lovesick
Lower Buckhorn
Mitchell
Moore
Omemee Pond
Pigeon (T)
Raven
Rice (T)
Round
Sandy
Sandy
Stony
Sturgeon

(b) Lakes with an area less than 10.0 ha. and/or a mean depth less than 1.0 m:

Beloporine
Buckley
Goose
Little Whitney
Lost (Dummer)
Mud
Rotten

(c) Streams (C) - streams also with coldwater sections:

Alnwick Un. 1
Asphodel Un. 1
Baxter Creek (C)
Bear Creek
Beaverton River
Belmont Un. 1
Belmont Un. 2
Belmont Un. 3

(c) Streams (Cont'd)

Bexley Un. 1
Birdsall Creek
Braithwaite Creek
Burnt River
Butternut Creek
Cartwright Un. 2
Cavan Creek (C)
Chemung Creek (C)
Corbett Creek
Crowe River
Darlington Un. 1
Darlington Un. 2
Darlington Un. 3
Deer Bay Creek
East Cross Creek (C)
Emily Creek
Emily Un. 1
Fenelon Un. 1
Foster Creek
Gage Creek (C)
Graham Creek (C)
Grass Creek
Hamilton Un. 1
Hamilton Un. 3
Hamilton Un. 5
Harmony Creek
Hawker Creek
Hope Un. 2
Indian River
Jackson Creek (C)
Jennings Creek
Lakefield Creek
Lynde Creek (C)
Mariposa Brook (C)
Martin Creek (Fenelon Twp)
McLaren Creek
Meade Creek
Nonquon River
North River
Oshawa Creek (C)
Otonabee River
Otter Creek
Ouse River (C)
Pearns Creek
Perch Creek
Percy Creek
Pigeon River (C)
Plato Creek (C)
Potash Creek
Pringle Creek
Reach Un. 1
Reach Un. 2
Reforestation Creek
Robinson Creek
Rutherford Creek
Sandy Creek
Sawer Creel
Scugog River
Snelgrove Creek
Squaw River
Squirrel Creek (C)
Staples Creek
Stony Creek
Talbot River
Tooley Creek
Verulam Un. 1
White's Creek (Argyle)
Wicklow Creek

Inland Coldwater Fishery

(a) Lakes - none

(b) Streams (LO) - Lake Ontario Tributaries:

Alnwick Un. 2
Alnwick Un. 3
Barnumhouse Creek (LO)
Baxter Creek
Beloporine Creek
Bowmanville Creek (LO)
Brook Road Creek (LO)
Burnley Creek
Cartwright Un. 1
Cavan Creek
Chidley's Creek
Clarke Un. 1 (LO)
Cobourg Brook (LO)
Cold Creek
Crysler Point Creek (LO)
Dollars Creek
East Cross Creek
Farewell Creek (LO)
Gage Creek (LO)
Ganaraska River
Goose Creek
Graham Creek (LO)
Haldimand Un. 1 (Grafton Creek) (LO)
Hamilton Un. 2 (LO)
Harwood Creek
Hope Un. 1 (LO)
Jackson Creek
Lakeport Creek (LO)
Lucas Point Creek (LO)
Lynde Creek (LO)
Mariposa Brook
Martin Creek
Newtonville Creek (LO)
Nonquon River
Oshawa Creek (LO)
Ouse River
Pigeon River
Plainville Creek
Plato Creek
Port Britain Creek (LO)
Port Grandy Creek (LO)
Robins Creek
Salt Creek
Shelter Valley Creek (LO)
Soper Creek (LO)
Squirrel Creek
Wilmot Creek (LO)

FISHERIES RESOURCE MAP
LINDSAY DISTRICT

Cold Water Fishing

	MUNICIPAL LOCATION
LYNDE CR.	TOWN OF WHITBY
OSHAWA CR	CITY OF OSHAWA
HARMONY CR	CITY OF OSHAWA
FAREWELL CR.	TOWN OF NEWCASTLE
BLACK CR.	TOWN OF NEWCASTLE
BOWMANVILLE CR	TOWN OF NEWCASTLE
SOPER CR	TOWN OF NEWCASTLE
WILMOT CR	TOWN OF NEWCASTLE
GRAHAM CR	TOWN OF NEWCASTLE
MULLIGAN CR	TOWN OF NEWCASTLE
GANARASKA R	HOPE TWP.
COBOURG BR	HAMILTON TWP.
BALTIMORE CR.	HAMILTON TWP.
BARNUM HOUSE CR	HALDIMAND TWP.
SHELTER VALLEY BR	HALDIMAND TWP.
BURNLEY CR	HALDIMAND TWP.
BRAITHWAITE CR	ALNWICK TWP.
DOLLARS CR.	ALNWICK TWP.
HARWOOD CR	HAMILTON TWP.
SQUIRREL CR	CAVAN TWP.
BAXTER CR	CAVAN TWP.
MILLBROOK P.F.A.*	CAVAN TWP.
CAVAN CR	CAVAN TWP.
JACKSON CR	CAVAN TWP.
FLEETWOOD CR	MANVERS TWP.
PIGEON CR	MANVERS TWP.
JANETVILLE CR	MANVERS TWP.
EAST CROSS CR	SCUGOG TWP.
HAWKER'S CR	VERULAM TWP.
MARTIN CR	VERULAM TWP.
OUSE R	ASPHODEL TWP.
NORWOOD POND	ASPHODEL TWP.

P.F.A.* - PROVINCIAL FISHING AREA

LAKE ONTARIO FISHING

LAKE TROUT — COHO SALMON
BROWN TROUT — CHINOOK SALMON
RAINBOW TROUT

NOTE
Ann Lm 1 denotes all Township
bl.Unnamed stream
cl Reference text number

LB Lamprey barrier

All fish sanctuaries on this map have been designated in size. Please contact MNR for further information.

----- Stream sections open to lake-run trout and salmon.

Only dams on Lake Ontario streams are shown.

1:200,000
kms
mi

Warm Water Fishing

RICE L.	
LAKE SCUGOG	
CANAL L.	
MITCHELL L.	
BALSAM L.	
CAMERON L.	
STURGEON L.	
PIGEON L.*	
OMEMEE POND	
BUCKHORN L.	
SANDY L.	
CHEMLING L.	
LOWER BUCKHORN L.	
KATCHEWANOOKA L.	
LOVESICK L.	
CLEAR L.	
STONY L.	
DUMMER L.	
LOST L.	
ROUND L.	
BELMONT L.	
CORDOVA L.	
CROWE L.	
NONQUON R.	
SCUGOG R.	
EMILY CR.	
OTONABEE R.	
INDIAN R.	

PANFISH INCLUDES YELLOW PERCH, PUMPKINSEED, ROCK BASS, AND BULLHEADS.
*INCLUDES BIG AND LITTLE BALD LAKES

COMMON ● RARE ○ ABSENT

Crown Land
Provincial Park
Conservation Authority Property
Indian Reservation
Type Lake For Kawartha Lakes Assessment Unit
Cold Water Stream Fishery
Warm Water Stream Fishery
Stocked Lake
Commercial Fishery
Provincial Fishing Area
Provincial Hatchery
Private Hatchery
Fish Sanctuary
Dam
Dam With Fishway
Dam With Manual Transfer
Water Access Point
Provincial Highway
Divided Highway
County Road
District Boundary
Township Boundary

Source:
Base Map from the Ministry of Transportation and Communications 1976. Lindsay Administrative District Central Region Revised 1985.

Ministry of Natural Resources

Hon. Vincent G. Kerrio, Minister
Mary Mogford, Deputy Minister

Lake Ontario